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V O L. II.

By *STEPHEN SWITZER*, Gardener,
Several Years Servant to Mr. *London* and Mr. *Wife*.

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By your LORDSHIP'S

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Presented at the Anniversary Meeting

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&c.

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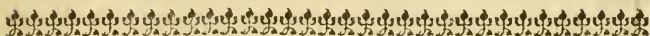
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G E O.



Geometrical Instructions.



INTRODUCTION.

AMONGST the several Busineſſes to which the Mathematicks is turn'd, 'tis certain that 'tis no where and in no Caſe more uſeful, plain, and diverting, than in this of Laying out of Gardens, Villa's, and large Eſtates: For however extenſively the Word *Geometry* is now apply'd, it was, at firſt, no more than the meaſuring out, diſtributing, and fixing, the Boundaries, or Encloſures, of the large Demefnes, and the leſſer or more immediate Decorations of the noble Villa's and Granges of the ancienteſt and politeſt Part of the World, of which the well-known Relation of the Over-flowing of the River *Nile* undeniably proves.

To this I ſhall then apply what I have here to ſet down, as neceſſary to be learnt by all young Surveyors and Layers out of Ground, not mixing or confounding it with thoſe many Rules and Problems that are contain'd in other Books of the Mathematicks, out of which 'tis not eaſy for a Beginner, nor indeed for many Gardeners of ſome Standing, to collect what is uſeful and neceſſary to be known.

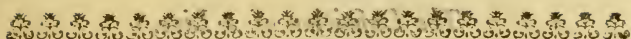
I ſhall

I shall begin first with the Principles of Geometry, and so go on through the whole Practice thereof, as far as it relates to our present Purpose. And for our readier Introduction to it, we are to understand that *Geometry* is establish'd upon three Sorts of Principles, viz. *Definitions*, *Axioms*, and *Petitions*.

Definitions are, first, brief Explanations of the Names and Forms of Lines, Superficies, &c. that are made Use of in all Parts of superficial Mensurations and Schemes; and this is particularly useful in *Gardening*, &c. to enable a Person to speak properly and intelligibly.

Axioms are self-evident Truths, which there is the least Reason to make use of, of any Thing us'd in the Mathematicks: As for Instance, that a Line three Foot, is equal to one, two, three, or four (separately) of the same Length, &c. and is us'd on no other Account than to demonstrate the Rationale of Addition, Substraction, either of Lines or Numbers.

And *Petitions* are clear and intelligible Demands, whereof the Execution and Practice requires not any Demonstration; thus it is easy for the most unlearn'd, when he is bid to draw a streight Line, or trace out a Circle, to do it, and such other Things that are requir'd in this Division. These being the Preliminaries of Geometrical Practice, let us then begin on the definitive Part thereof.



C H A P. I.

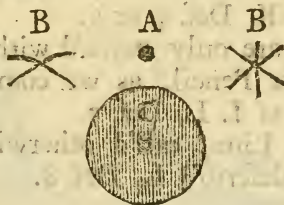
The Definition of a Point, and the Motion thereof, a Line.

§ 1. **A** Point is generally put as the first Principle in the Mathematicks, and that which of it self has no Part or Parts.

And by this we understand, that the Point hath neither Length, nor Breadth, nor Depth; and that also 'tis not sensible, but only intellectual, seeing there is nothing which falleth under Sense, which hath not a Quantity; and that there is no Quantity without Parts, which would altogether contradict this Definition. Nevertheless, as none can make any Operation, but by the Interposition of corporeal Things, they represent therefore the Mathematical Point by the Point Physical, which is the Object of the Sight, the smallest and least divisible to our Sense, and is made with the Point of a Needle, or with the End or Point of a Compass or Pencil, as the Point noted by A.

The Point central, or Center, is a Point by which a Circle is drawn; or rather it is the midst of a Figure, as C.

The Point secant, is a Point where the Lines do divide themselves, and which is ordinarily call'd a Section, as B.B.



The Definition of a Line.

§ 2. The Line is a Length without Breadth, made by the Motion of a Point, and is of several Kinds, as it receives Difference of Motion.

The right or strait Line, is that which is equally compriz'd within its Extremities, as A B, Def.

The circular Line, is as plainly made from the round Motion of a Pair of Compasses, as C D, Def. 2.

The crooked Line, is that which turneth or wandereth from its Extremities by one or more Turnings aside, as E F, Def. 3.

The composite or mix'd Line, is that Part of it which is crooked, and Part strait, as is the Line G H, Def. 4.

The Line is also distinguish'd into finite and infinite, into apparent, and occult or hidden.

The Line finite, is a Line bounded at each End of a certain Length; suppose 100 Yards certain, or any other certain Dimension, whether strait or circular, as are the Lines pointed at both Ends, and mark'd I I I I, Def. 5.

The infinite, is a Line of an undetermin'd Length, as K K, Def. 6.

The apparent, or Tract, is drawn very strong, as either K — K, Def. 5 or 6.

The occult are only mark'd with the Point of the Compass or Pencil, as we commonly do our Hedge-Lines, as L L, Def. 7.

The spiral Line, call'd otherwise the *Voluta*, from *volvo* is describ'd L, Def. 8.

Def. 1.stA ——— *Line 1.st* ——— BDef. 2.^d*Line 2.^d*

C ————— D

Def. 3.^d*Line 3.^d*

E ————— F

Def. 4.th*Line 4.th*

G ————— H

Def. 5.^t*Line 5.^t*

I ————— I

*Line 6.^t*Def. 6.^t

I ————— I

Line 7.th

K ————— K

*Line 8.th*Def. 7.th

K ————— K

Line 9.th

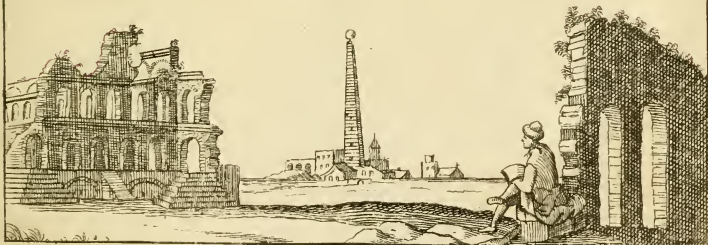
L ————— L

Line 10.th

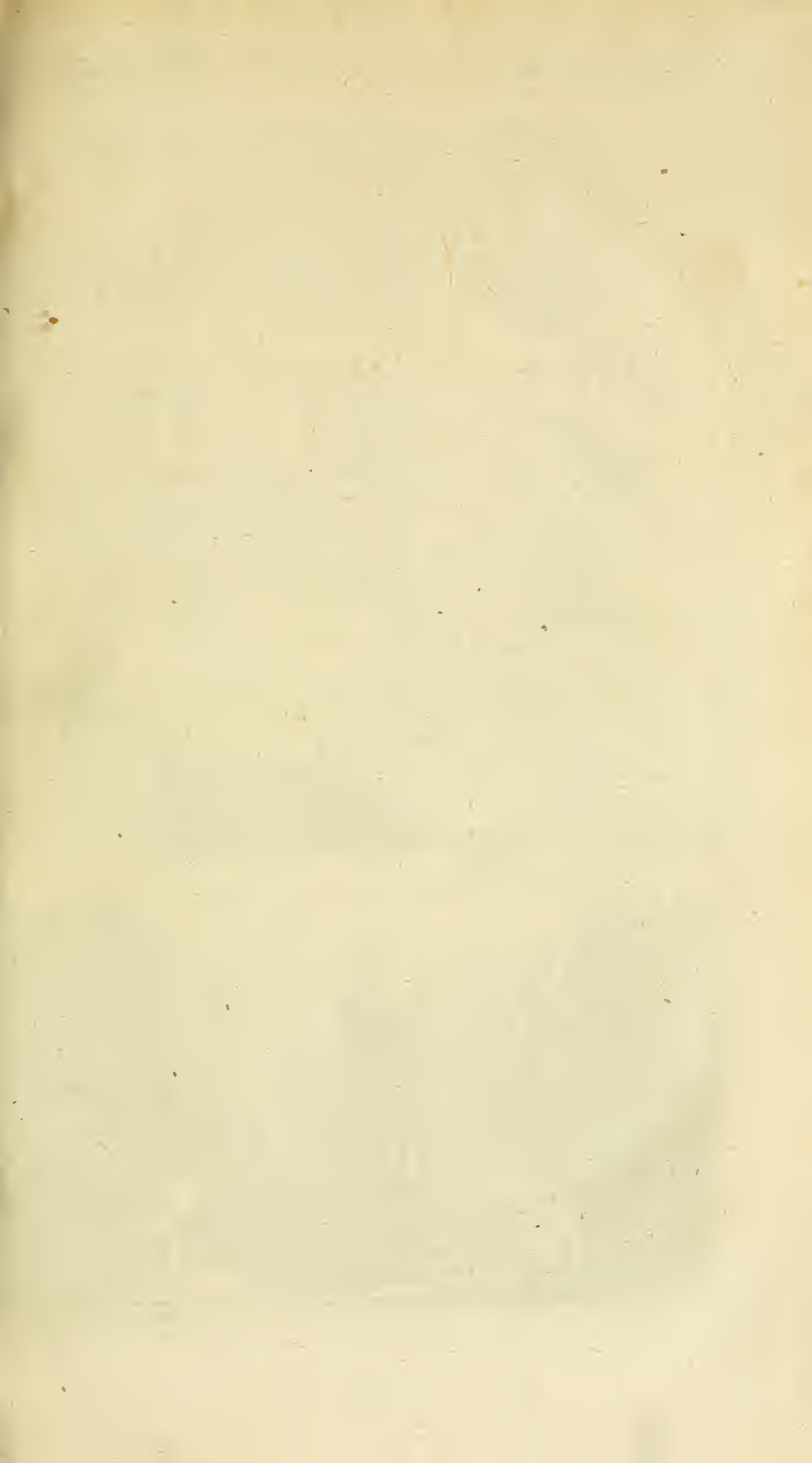
L ————— L

Def. 8.th

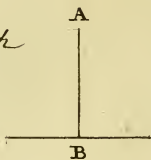
M ——— N ——— O



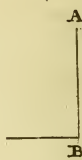
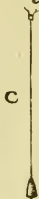
Sutton Nicholls sculp.



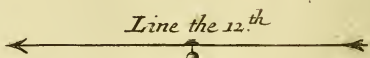
Def. 9.th



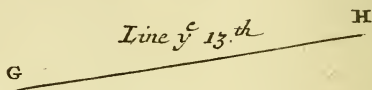
Line γ 11.th



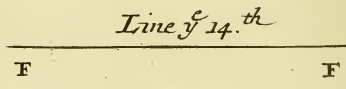
Def. 10.th



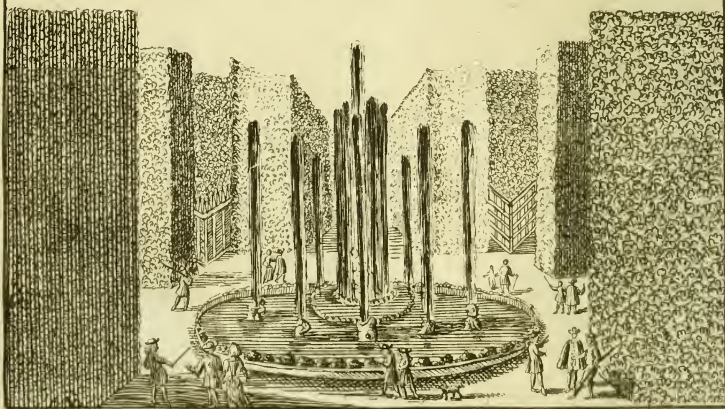
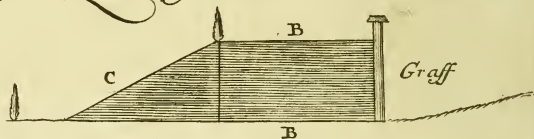
Def. 11.th



Def. 12.th



The Profile Lines of a Terras walk



Sutton Nicholls sculp.

The Line also receives divers Denominations, according to its divers Positions and Properties.

A Perpendicular is a right Line, that is made or express'd by the Fall of, a Plumb, or by the Elevation at right Angles of any Line upon the Middle or End of another, as is A, B, and C, Def.

9. A Line horizontal, is a Line of an equal Poise, which inclineth it self equally on the one Part and the other, as D E, Def. 10. and in Gardening is generally understood to be the Basis, or Bottom of a Terras, Slope, &c. tho' it is properly any level Line, and may as well signify the Top of, a Terras, or any other Plane, or dead Level.

An oblique Line, is neither horizontal, nor plumb, or perpendicular, but of a Byas or Slope; and is in Gardening, where Ramparts or Terras-Walks are made, apply'd to the Slope of them. This is call'd the Hypotheneuse, or subtense Line, when we speak of artificial Triangles; which is the Construction of the Slope of a Terras; notwithstanding in that famous Problem of *Euclid*, (for the Invention of which *Pythagoras* is said to offer an Hecatomb) it is us'd for the Basis of a rectangled Triangle.

This Line is simply demonstrated by the Line G H, Def; 11. and the other two, and this, compos'd by the three Lines A B C, as they are severally plac'd above.

Lines parallel, are those that are, of any equal Distance from each other; which, tho' they are extended never so far, are neither nearer nor farther off from each other, as are the Lines F, Def.

Lines also receive their Names as they encompass, pass through, touch, or dissect a superficial or solid Figure.

Side-Lines are those which encompass any Sort of Figure, be it either a Square or a Polygon, as does A B C D, in Def. 13. Fig. 1.

A diagonal Line, is that which passeth thro' the very Center of a Figure, and which beginneth and endeth at two opposite Angles, as E F, Fig. 2. and G H, Fig. 3. Def. 14.

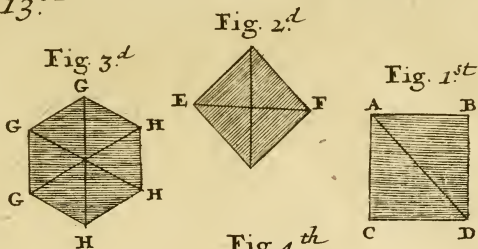
The Diameter has chiefly Relation to a Line that passes through, and touches the Center of a Circle, or Oval, as does the Line I K in Figure the 4th, and L M in Figure the 5th and 6th. In an Oval there are two, call'd the transverse and conjugate Diameters.

The Chord, or subtense Line, is a Line that cuts off only a smaller Part of a Circle from a greater; or is more plainly like the String of a Bow, which is Part of a Circle, as is the Line N O, Figure the 7th; the Bow whereof is N O P, Figure the 7th; and the remaining Part of the Circle is R, Fig. 10.

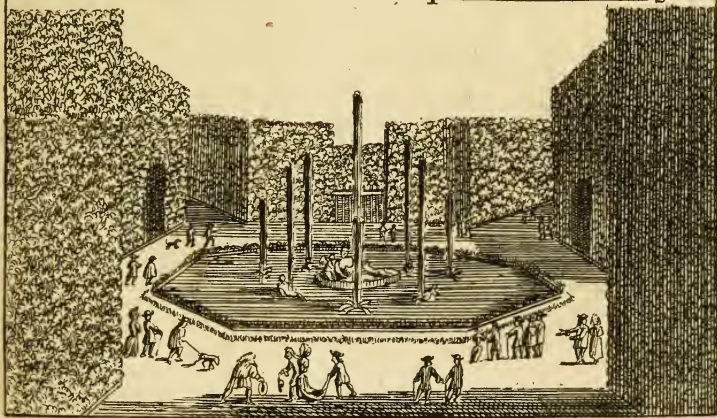
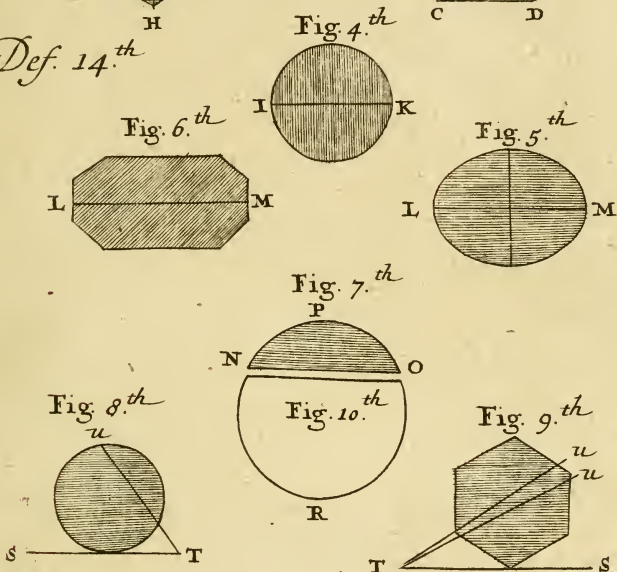
A Line tangent, is that which toucheth any Figure, (whether circular or polygonar) without dividing it, and without being able to divide it, altho' it was prolong'd never so far, as are the Lines S T in Fig. 8, 9.

A Line secant, is that which divideth, crosseth, or traverseth any Circle, Oval, or Polygonal Figure, the said Oval or other Figure remaining whole; and is plainly demonstrable by the Lines T U in Fig. 9, 10.

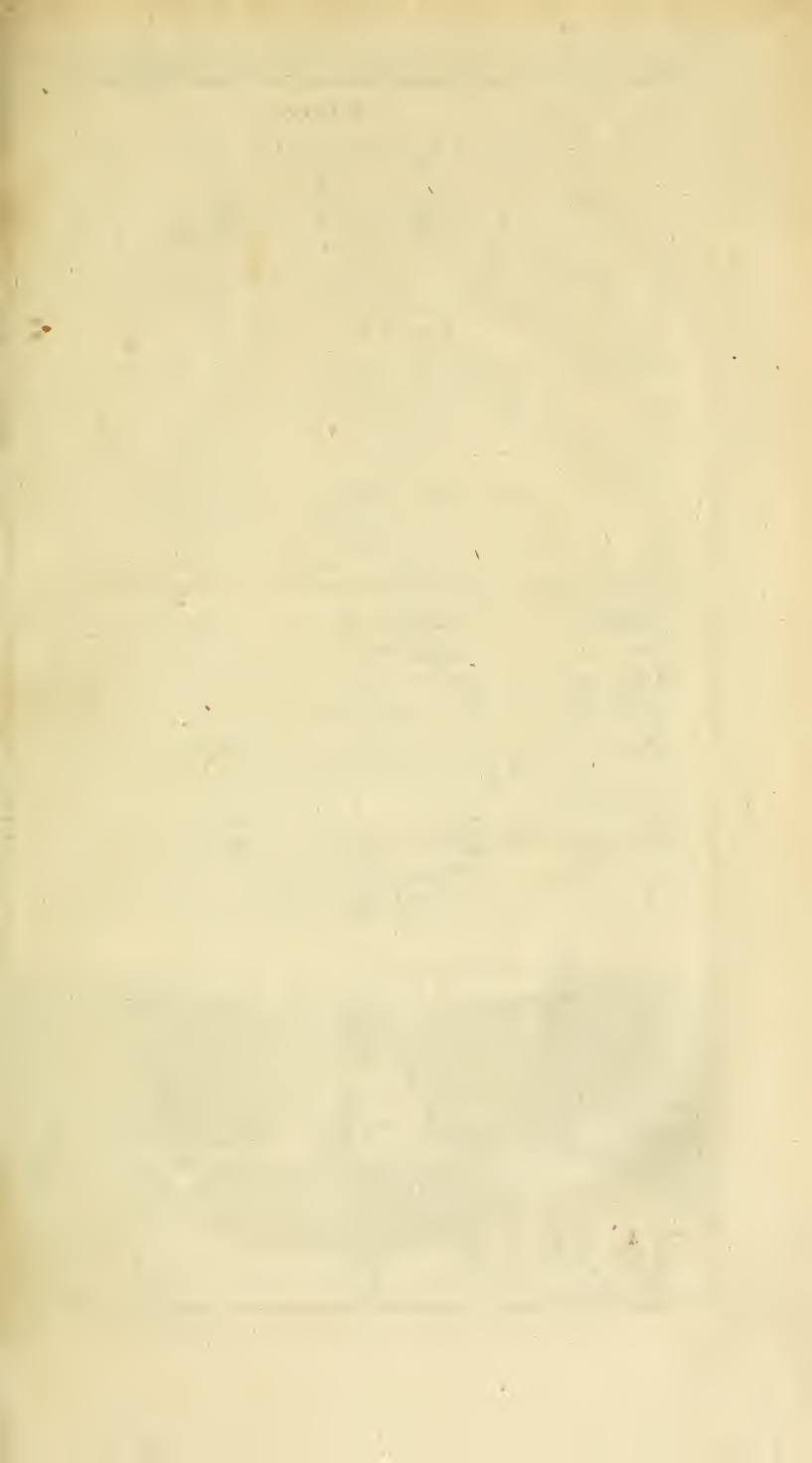
Def. 13.th



Def. 14.th

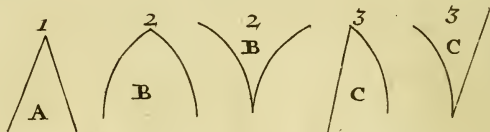


Sutton Nicholls's sculp.



Def. 1.st

Figures



Def. 2.^d

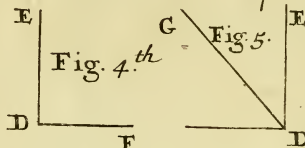
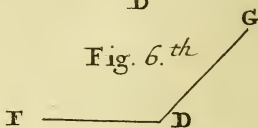
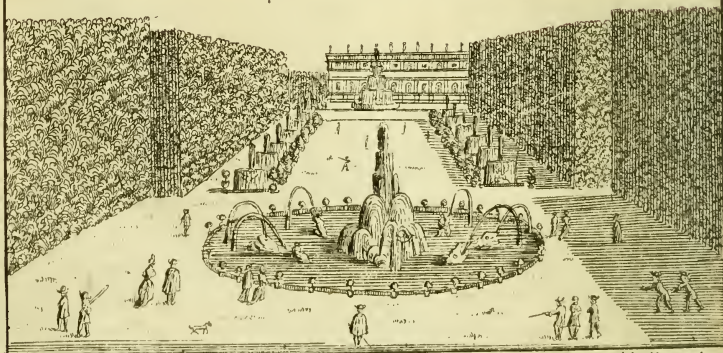
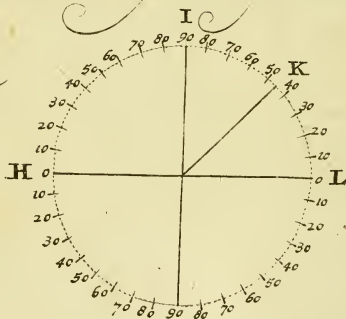


Fig. 6. th



The Degrees whereby an Angle is measured

Fig. 7. th



Antton Nicholls sculp.

The Definition of an Angle.

§ 3. An Angle is the indirect Meeting of two Lines at one and the same Point; or rather, it is the Space encompass'd between the indirect Meeting, or Concourse of two Lines, joining together in one Point, as A B C, Fig. 1, 2, 3.

When ever this Concourse is made of two strait Lines, it is call'd Rectilineal, as A, Fig. 1.

When it is made of two crooked Lines, it is call'd Curvilineal as B, Fig. 2.

But when it is made of one crooked and one strait Line, it is call'd Mixtilineal, as C, Fig. 3.

The Angle Rectilineal receiveth particular Denominations as it is more or less open, (*viz.*) right, acute or sharp, blunt or obtuse: So that these Terms, of Rectilineal, Curvilineal, and Mixtilineal, are in Respect of the Quality of the Lines, and those of right, sharp, and obtuse, in Respect of the Quantity of the Space enclos'd within those Lines.

It is a right Angle, when one of the Lines is perpendicular upon another, as when E. is perpendicular to D, F Fig 4. and this exactly 90 Degrees of a whole Circle, which is suppos'd to contain 160 Degrees, as is demonstrable by Scheme. H I K L, Fig. 7.

It is an acute Angle, when it is less open than a right Angle, E D G which contains about 45 Degrees, and is mark'd also on the Scheme, H I K L, Fig. 7.

The Angle is obtuse, when it is more open than a right; that is, when 'tis above 90 Degrees; so that the right Angle, or 90 Degrees, and the acute Angle of 45 makes the obtuse Angle 135 Degrees, as appears in the Scheme, H I K L Fig. 7.

Of a Superficies.

§ 4. A Superficies is that which hath Length and Breadth without Depth, and according to Geometricians is the Production of a Line, as a Line is the Production of a Point.

And thus we must conceive, that the Line E F, in Fig. 2, moving on towards G, H, doth make the Superficies E F, G H, which is an Extension bounded with Lines, which hath nothing but Length and Breadth, without Depth or Thickness. And therefore it is the *Superficies*, Surface, and Boundaries of a Figure, if one consider it in Respect of its Extremities, which are the Lines that close it, and the Face that those Lines make by their Motion.

Superficies are of several Kinds, not only in Respect to the Inequality and the Number of Sides they are compos'd of, but also of the Difference of their Surface, or Levels.

Thus A is a plain *Superficies*.

B. a convex *Superficies*.

C. a concave *Superficies*.

And the two latter are, in Gardening, very often call'd Amphitheatres; so that in this Case, in Respect of their Depths and Heights, C may be a concave Amphitheatre, and B a convex Amphitheatre, whilst A is a Level Lawn Parterre. &c.

In fine, in the Construction and framing Geometrical Figures, a Point is the Term or Bound of a Line; the Line the Term, or Bound of a *Superficies*, and the *Superficies* is the Term or Bound of a Body.

D. Fig. 10. Is the Plan of a large multangular Concave, or hollow Amphitheatre.

Fig. 1.

Fig. 2.

Fig. 3.

Def. 1.st



Def. 2.^d Fig. 4.

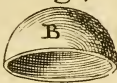


Fig. 5.

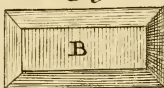


Fig. 6.



Def. 3.^d Fig. 7.

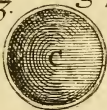


Fig. 8.

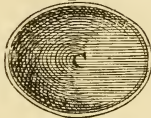
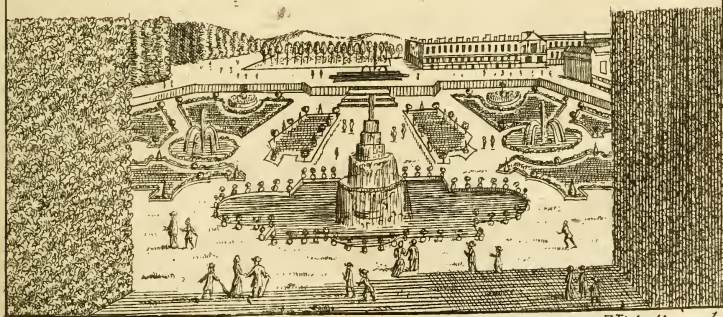
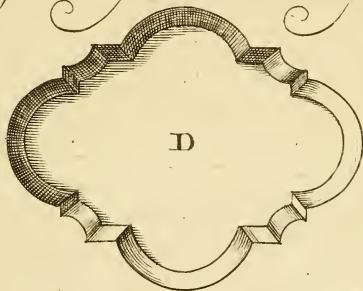


Fig. 9.



The Plan of a large Concave Amphitheatre

Fig. 10.



Sutton Nicholls sculp.

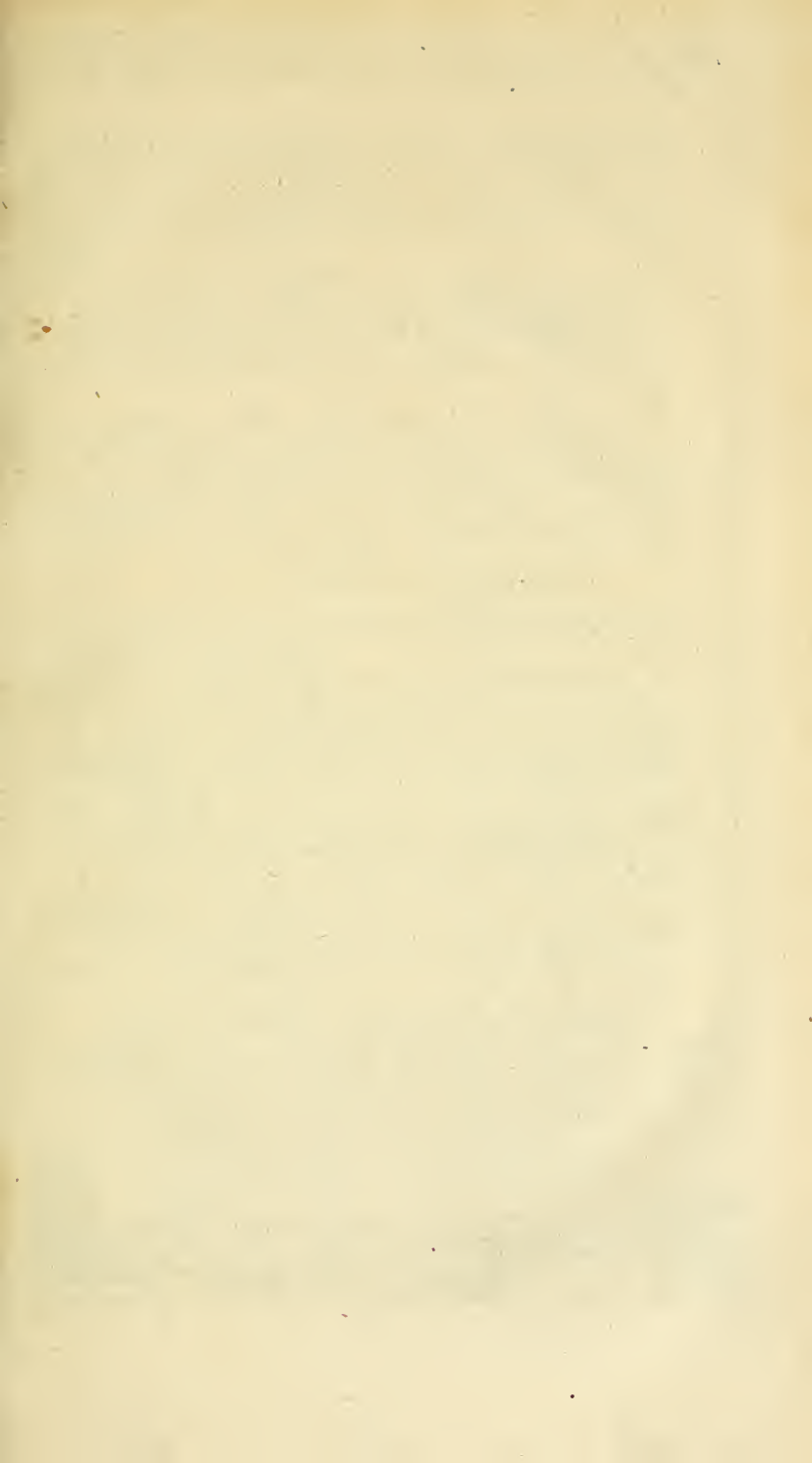


Fig. 1.

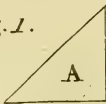


Fig. 2.

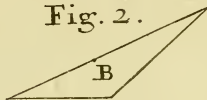


Fig. 3.

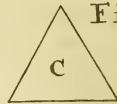


Fig. 4.



Fig. 5.

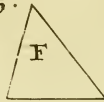


Fig. 6.



Fig. 7.

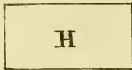


Fig. 8.

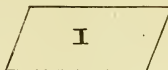


Fig. 10.

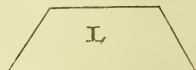


Fig. 9.



Fig. 11.

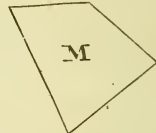


Fig. 12.

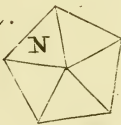


Fig. 13.

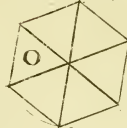


Fig. 15.



Fig. 14.

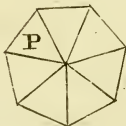


Fig. 16.

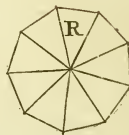


Fig. 17.



Fig. 18.

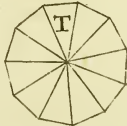
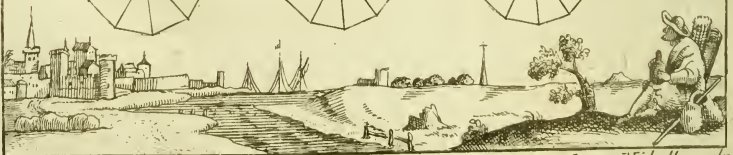
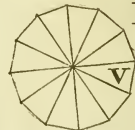


Fig. 19.



§ 5. Superficial Figures take their particular Names from the Number of Sides whereof they are compos'd; the first whereof (I mean Triangles) are distinguish'd by the Quality of their Angles, and by the Disposition of their Sides.

- A. A rectangled Triangle, has one right Angle, Fig. 1.
- B. A Triangle Amblygon, has one obtuse Angle, Fig. 2.
- C. A Triangle Octagon, has three sharp Angles, Fig. 3.

And is also in Respect of the Lines, call'd,

- C. A Triangle equilateral, as is the same, Fig. 3.
- E. A Triangle Isoscele, or equicrural, has two Sides equal only, as Fig. 4.
- F. A Triangle Scaleneous, has all his Sides unequal. *Vid.* Fig. 5.

Of Tetragonal or square Figures.

G. A right Square is compos'd of four equal Sides, and four right Angles, Fig. 6.

H. A rectangled long Superficies, or long Square, has right Angles and equal Sides, Fig. 7.

I. A Parrellogram has parallel Sides, but is not always rectangled; and both these last Figures are call'd Parrellograms, Fig. 8.

K. A Rhombus, or Lozenge, is a square Figure which has four Sides equal, but not the four Angles, Fig. 9.

L. A Rhomboid has its Sides parallel, without being equiangular or equilateral, Fig. 10.

M. A Trapeze, or Trapezium, is neither parallel, equiangular, nor equilateral, *Vid.* Fig. 11.

Of the several Kinds of regular Polygonal Figures.

- N. A Pentagon, or Figure of five Sides, Fig. 12.
- O. An Hexagon, or Figure of six Sides, Fig. 13.
- P. An Heptagon, or Figure of seven Sides, Fig. 14.
- Q. An Octagon, or Figure of eight Sides, Fig. 15.
- R. Enneagon, or Figure of nine Sides, Fig. 16.
- S. A Decagon, or Figure of ten Sides, Fig. 17.
- T. An Endecagon, or Figure of 11 Sides, Fig. 18.
- U. A Dodecagon, or Figure of 12 Sides, Fig. 19.

Of crooked and Curvilineal Figures, and of Figures mix'd and compos'd.

A Circle is a Figure perfectly round, drawn or describ'd from a Letter, from which the whole Circumference is of equal Distance. The Boundary Line whereof is call'd the Circumference, or otherwise, the circular Line that encloseth it. Fig. 1. Letter A.

An Oval (*ab Ovo*, an Egg) is a crooked Figure drawn from many Centers; and which Diameters divide into two Equals, Fig. 2. This is also call'd an Ellipsis; but this Word, as well as the Word Oval, is more properly apply'd to Fig. 3. Letter B, near the Shape of an Egg.

A Demi or Semi-circle or Oval, is the exact half of a Circle or Oval, as is C. D, Fig. 4. 5.

A Quadrant of a Circle, is the exact Quarter thereof, as E, Fig. 6.

A Segment or Part of a Circle, either more or less than the half or quarter of one, as is F. Fig. 7.

A Sector, or Section of a Circle, is contain'd within two Diameters, then half a Circle, as is G. Fig.

3.

Figures concentrical, or those which have one and the same Center, H H, Fig. 9. 10.

Figures excentrical are those which are contain'd in others of divers Centers, I I, Fig. 11, 12.

These being the most material Definitions, I pass now to the next Thing in Course to be known, which are the Axioms us'd in Geometry.

Fig. 1.



Fig. 2.

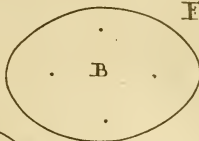


Fig. 3.



Fig. 5.



Fig. 4.

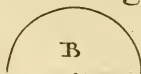


Fig. 6.

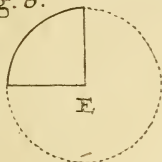


Fig. 8.



Fig. 7.

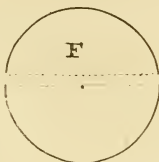


Fig. 9.

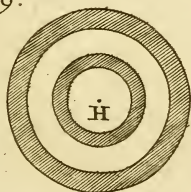


Fig. 10.

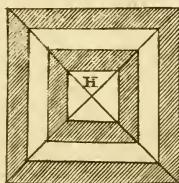


Fig. 11.

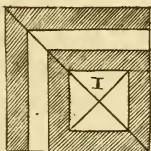
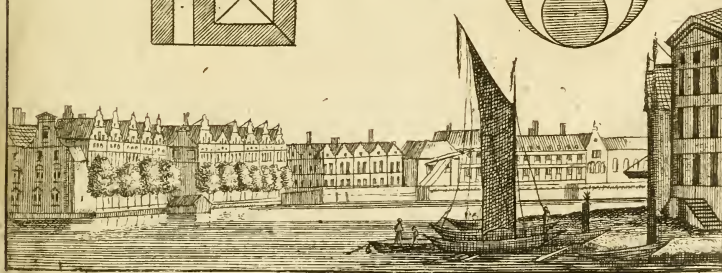
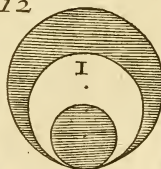


Fig. 12.



Sutton Nicholls sculp.



Fig. 1.

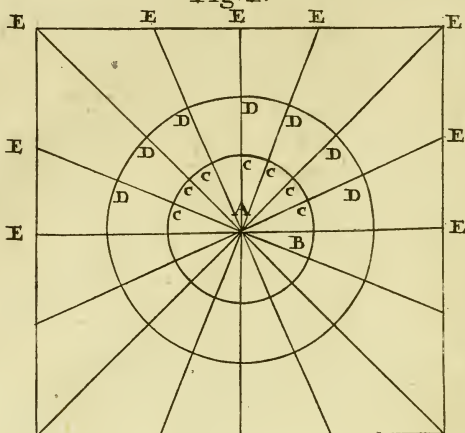


Fig. 2.

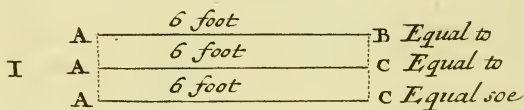


Fig. 3.

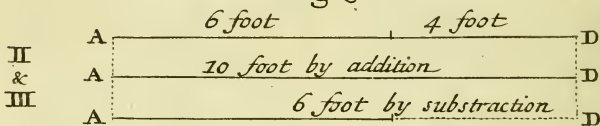
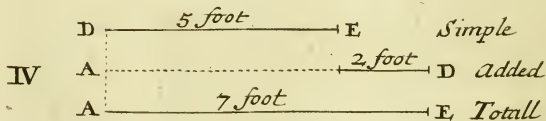


Fig. 4.



A X I O M I.

§ 6. *Things equal to one and the same, are equal amongst themselves.*

Thus the Lines A C, A C, which are equal to A B, are equal also between themselves.

A X I O M II.

If to equal Things one shall add Things equal, all will become equal.

The Lines A C, A C, are equal.

The added C D, C D, are equal.

All of them A D, A D, are therefore equal.

A X I O M III.

If from Things equal one takes equal Things, the Remainder shall be equal.

Thus if from the equal Lines A D, A D.

One take the equal Parts A C A C.

The remaining Parts C D, C D.

shall be also equal.

A X I O M IV.

If to Things unequal, one add Things equal, the whole will be unequal.

If to the unequal Lines D E, D E.

One adds the equal Lines A D, A D.

The whole A E, A E.

shall be unequal.

These Axioms may, at first Light, seem very strange to a young Learner, who may suppose them to be more difficult than they really are; I shall therefore demonstrate them by Lines number'd, which seems to me the best Way.

For the first 'tis no more, than that the Lines A C, tho' never so many Times repeated, or transpos'd to never so great a Distance, as they all appear to be equal to A B, so they are also ever amongst themselves: For Instance, being of six Foot in Length, they all of them are so, and equal to the first A B. The like may be said of the 2d and 3d Axiom.

And for the 4th, nothing is more plain, that if one add an equal Line, or Number of two Foot, to an unequal Line or Number of five Foot, the Produce must be seven Foot, which is still an unequal Number; and if, as in the 2d and 3d, you add or subtract the equal Line, or Number of four, from or to the equal Number of ten, the Product will be the equal Number of fourteen by Addition, or six by Substraction.

A X I O M V.

If from Things unequal one takes Things equal, the Remainder shall be unequal.

If from the unequal Lines $A E, A E,$
 One take away the equal Line $A D, A D,$
 The remaining Part $D E, D E,$
 will be unequal.

Explanation. This is the very Reverse of the 4th Axiom; since, if the equal Number, or Line of two Foot, be taken from the whole unequal Line, or Number of seven Foot, 'tis certain, the unequal Number of five will remain, which is the Purport of this Axiom.

A X I O M VI.

The Things that are double to one another, are equal amongst themselves.

Thus the Lines $D D, D D,$
 Which are double to the Line $A D,$
 are equal between themselves.

Explanation. This is demonstrated by the Lines in Fig. 7. where the Lines $D D.$ of 40 Foot long, tho' they are double the Line $D A,$ are nevertheless equal amongst themselves.

A X I O M VII.

The Things which are the half of one and the same, or of Things equal are unequal amongst themselves.

Thus the Lines $A D, A D,$
 Which are the half of the Lines $D D, D D,$
 are equal between themselves.

Explanation. This is again the Reverse of the last Axiom, (*viz.* the VIth) for tho' the Lines $D D;$ are double to the Lines $A D, A D,$ yet they are nevertheless equal amongst themselves.

That which is said of Lines may be also said of Superficies and Solids; however trivial these Things may appear, 'tis on these our Mathematical Disputants ground their Arguments; and tho' they are not very much us'd in our Way, they could not possibly be pass'd over without manifest Injury to this Subject.

Fig. 5.^t

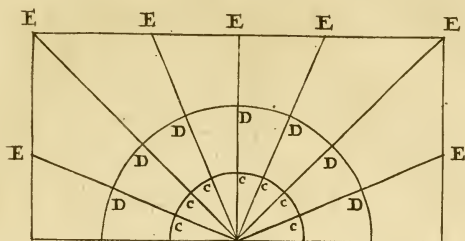


Fig. 6. *ax.* VI.VII.

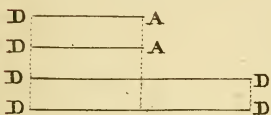
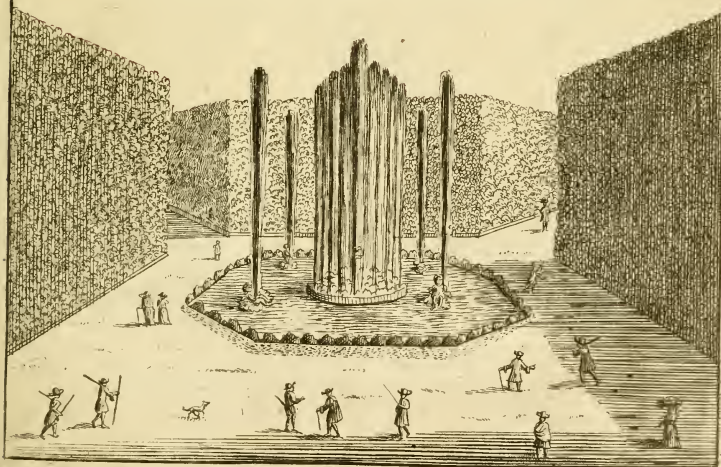
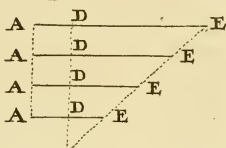
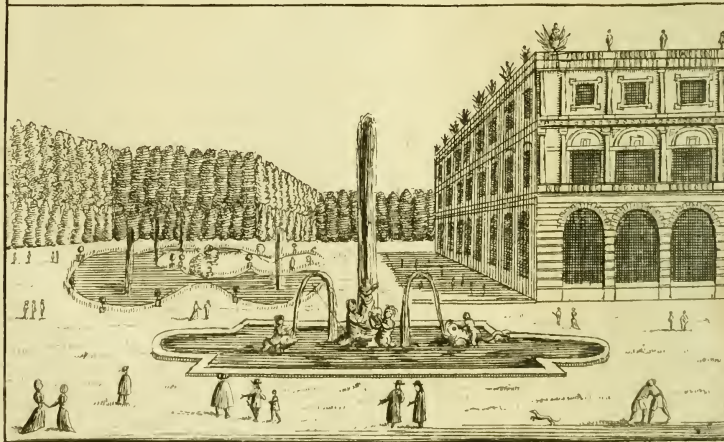


Fig. 7. *ax.* V.



Sutton Nicholls sculp.





Sutton Nicholls sculp.

§ 7. *Positions, or Demands, in order to the putting of Geometry into Practice.*

DEMAND I.

Draw a strait Line from A to B.

The PRACTICE.

Apply the Ruler to the Points A B; and drawing the Pencil along by the Side of the Ruler, it will make the Line A B.

DEMAND II.

Enlarge infinitely the Line C D by E, &c.

The PRACTICE.

Join the Rule to the Line C D, continue the said Line C D, *ad infinitum*, towards, by, or beyond E, and it answers this second Demand.

DEMAND III.

Draw a Circle from a Point — A,
And the Interval ——— A B.

The PRACTICE.

Set one Point of the Compass at the Point given, A
Open the other unto the Point ——— B
Turn the Compass upon the Point ——— A
And drawing it from the Point ——— B
Describe the Circle ——— B D E

DEMAND IV.

From the Points given ——— E and F,
Make the Section ——— G.

The PRACTICE.

Open the Compasses as you shall have Occasion, that the Opening may be more than the half Distance between E and F; and by this Opening from the Point E, draw the Arch ——— l m.

And from the Point F, the Arch — h i.

The Section at ——— G

Is the Demanded.

PROPOSITION I.

§ 8. *To elevate a Perpendicular at any Point of a Line, particularly the Middle and the End.*

The Practice on Paper on the Middle, Fig. 1.

From the Point given C, touch the Line in D and E.

From the Point D E, make the Section I.

By which Means, C I shall be the two Points whereby the Line is to be drawn perpendicular.

The same on the End of the Line, Fig. 2.

From the Point A, draw the Arch G, H, M.

From the Point G, draw the Arch A H.

From the Point H, draw the Arch M N.

From the Point M, draw the Arch H N.

Then draw the requir'd Perpendicular A C.

There is not Occasion on Paper to make all these Arches; for which Reason I have put down Fig. 3. to shew you how to avoid it, as the other is to explain it.

Fig. 4, is another Way which almost explains it self, and the fifth are the Lines simply consider'd.

The Practice on the Ground.

A Garden Line very plainly effects the same on the Ground, as the Compasses do on Paper; but our best Method is our *Garden-Square*, which apply'd to any Line, sets off a Perpendicular, as is evident by the Practice, Fig. 6, 7, 8.

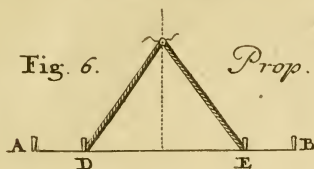
But in case a Square is wanting, a Measure of eight and six Foot with a ten Foot from one End to the other, makes a good Square, as may be seen in Fig. 9. and it is by this that all right-angled Figures are set out in Gardens, and all other Works.

It is particularly by this, that all middle Lines, and grand Avenues and Walks, are set out from a House, &c.

*By a Garden Line Practice I.st
on the Ground;*

Fig. 6.

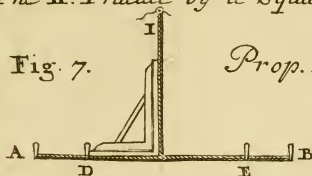
Prop. 1.



The II.^d Practice by a Square.

Fig. 7.

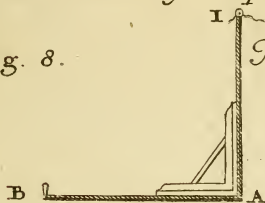
Prop. 1.



The III.^d Practice by a Square.

Fig. 8.

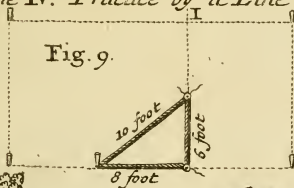
Prop. 1.



The IV.th Practice by a Line.

Fig. 9.

Prop. 1.



Upon Paper

Fig. 1.

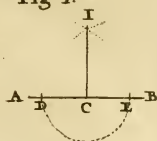


Fig. 2.

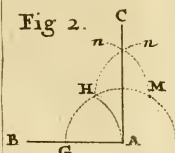


Fig. 3.

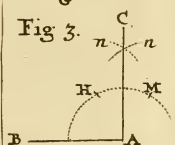


Fig. 4.

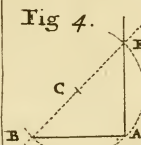
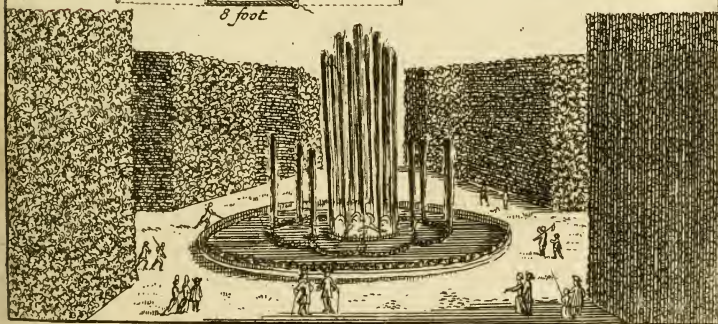
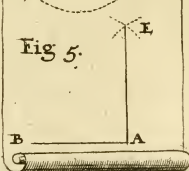


Fig. 5.



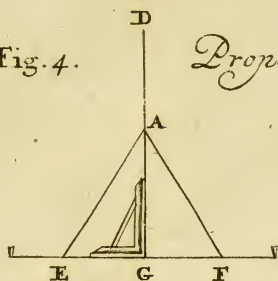
Sutton Nicholls sculp.



Practice the Ist upon y^e Ground

Upon the Paper

Fig. 4. Prop. 2.



The II^d Practice

Fig. 5. Prop. 3.

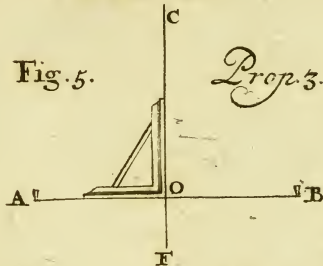


Fig. 6. Prop. 4.



The III^d Practice

Fig. 1.

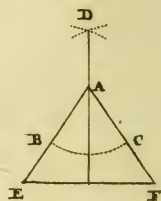


Fig. 2.

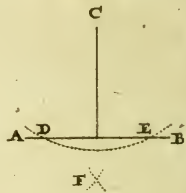
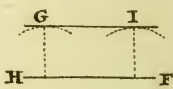


Fig. 3.



In this Page I shall comprize three Propositions, together with their Practice on the Ground.

PROPOSITION II.

To let fall a Perpendicular on the Point of an Angle.

Upon Paper, Fig. 1.

From the Angle A, describe at Pleasure the Arch B C; and from the Point B and C, make the Section D; and the Line E F is the Line requir'd.

Practice on the Ground, Fig. 4.

Move the Garden Square on the Base of Triangle E F, 'til the Point of the Square G, come over-right the Point A, then strain the Line to D.

PROPOSITION III.

To bring down a Perpendicular upon a Line given, or a Point without or near that Line.

Upon Paper, Fig. 2.

This is something like the former; for from the Point C you are to draw D E, cutting the Line A B at D and E; from the Points D and E, make the Section F; draw the Line C F, and the Line C O will be the Line demanded.

Practice on the Ground, Fig. 5.

In this Case either the Line or Square will do; the Method has been hinted at already, and the Scheme tells the rest.

PROPOSITION VI.

By a Point given, to draw a Line parallel to a right Line given.

Upon Paper, Fig. 3.

Let H F be the Lines given, add G the parallel Distance; fix the Compass in H and F, and describe the Arches G and I; by applying the Ruler to G and I, you may draw the Line requir'd.

Practice on the Ground, Fig. 6.

By applying the Square to the Points H and F, this Parallel is easily set off in G and I. *Vide* the Scheme, Fig. 6.

I shall likewise in this Page, bring in Propositions relating to the dividing of a Line, and an Angle into two Parts, and of the Manner of transferring of an Angle from the Paper to the Ground, &c.

PROPOSITION V.

To cut a right Line given into two equally.

Upon Paper Fig. 1. 2.

From the Point A draw the Arch C D, and without opening or shutting the Compasses, from the Point or End B, draw the Arch E F; and a Line or Ruler apply'd to G and H, will divide the Line A B equally in two at O.

Practice on the Ground, Fig. 6.

The doubling the Garden Line, to find the half Length of any Line is so common, that I need not repeat it, tho' this Method is more artificial, and is preparatory to the next.

PROPOSITION VI.

To cut an Angle into two equal Portions, upon Paper, Fig. 3.

From the Angle A draw at Pleasure the Arch D E, and from the Points D E make the Section O; then draw the Line A O, which is what is requir'd (*viz.*) dividing the Angle into two equal Parts.

Practice on the Ground, Fig. 7.

Being perform'd by a Line, as it is upon Paper by the Compasses, I need not repeat it.

PROPOSITION VII.

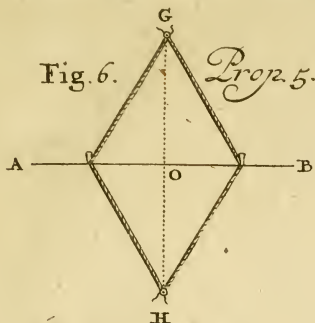
To make an Angle equal to an Angle given, or transfer an Angle from one Paper to another, or from Paper to the Ground.

From the Angle D draw at Pleasure the Arch C G, and without altering the Compasses, from the Point D draw the Arch H O, and make the Arch H E equal to the Arch C G; draw the Line D E, and both Angles will be alike.

Practice on the Ground. Fig. 8.

Is the same as upon Paper. *Note*, this is very useful in setting of Diagonal Lines in Gardening, as may be seen. Fig. 8.

Practice the I.st on the Ground



Practice the II.^d on the Ground

Fig. 7. Prop. 6.

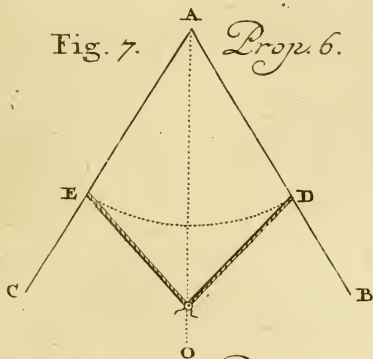
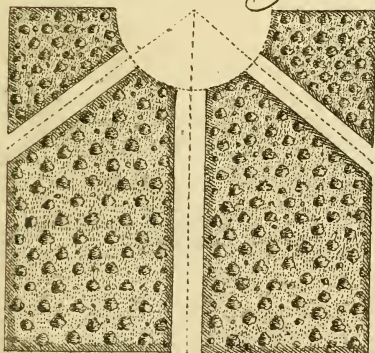


Fig. 8. Prop. 7.



Upon Paper

Fig. 1.

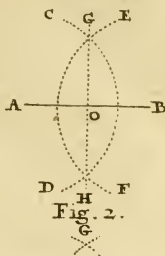


Fig. 2.

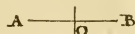


Fig. 3.

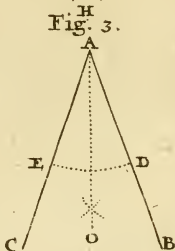


Fig. 4.

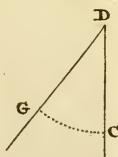
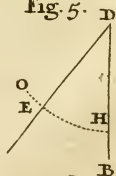


Fig. 5.

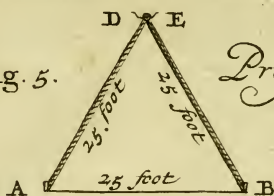






Practice the Ist on the Ground

Fig. 5.



Prop. 1.

Practice the II^d upon the Ground

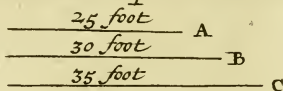
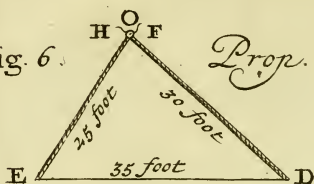


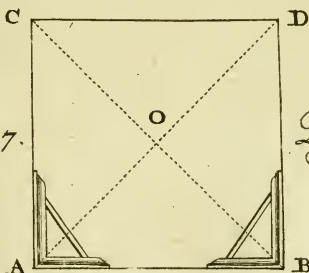
Fig. 6.



Prop. 2.

The III^d Practice on the Ground

Fig. 7.



Prop. 3.

Upon Paper

Fig. 1.

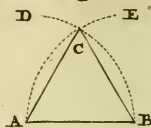


Fig. 2.

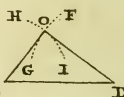
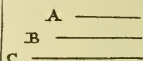


Fig. 3.

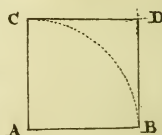
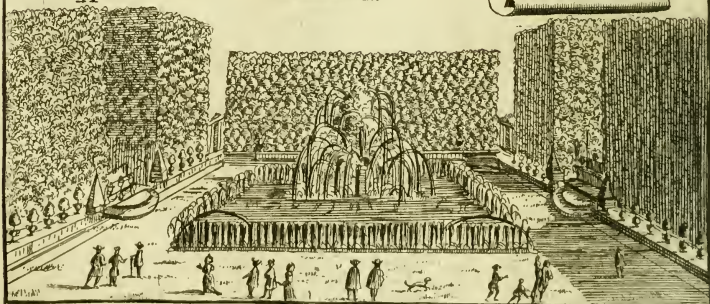
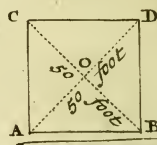


Fig. 4.



§ 9. Having put down what seems to be most necessary relating to Lines, I come now to shew how these Lines produce superficial Figures.

PROPOSITION I.

And first how to frame a Triangle equilateral, upon a strait Line given.

From the End A, and the Interval A B, describe the Arch B D; and from the End B, and the Interval B A, describe the Arch A E; and from the Section C draw the Lines C A, C B; and A B C shall be the equilateral Triangle demanded. Fig. 1.

PROPOSITION II.

But because there are several Sorts of Triangles, I shall in this Proposition shew, *how to make a Triangle from any three given Lines, supposing A B C.* Fig. 2.

Draw the strait Line D E, equal to the Line A A, from the Point D, and from the Interval B B; describe the Arch G F; from the Point E, and from the Interval C C, describe the Arch H I; from the Section O, draw the Lines O E, O D; the Triangle D E O, shall be compriz'd of three right Lines, equal to the three given Lines A B C. Fig. 3.

PROPOSITION III.

How to frame a Square upon one right Line given and bounded.

Elevate the Perpendicular A C from the Point A describe the Arch B C; from the Points B C, and from the Interval A B make the Section D; from the Point D draw the Lines D C, D E; and A B C D shall be the Square demanded.

Practice on the Ground.

This is so easy, and so like the Practice on Paper, it need not be repeated; however, I have put down the Figures, and shewn the Method of making a Square upon the Ground, and shall add,

PROPOSITION IV.

The Way to prove a Square.

Which is indeed only by measuring Diagonal or Cross-Ways; and if the Measure (supposing 50 Foot) is exactly alike, you may conclude your Square is true. *Vid.* Fig. 4, and 7. Otherwise it is false.

Before we proceed to shew the laying out Polygonal Figures or Figures of five, six, seven, or eight Sides, &c. it will be necessary we should lay down the Methods of striking out circular or crooked Figures, which are, generally speaking, the Basis of all Polygonal Superficies.

PROPOSITION V.

To find the Center of a Circle. the Center of which is lost, or any other Way requir'd.

Place at Discretion the three Points A B C upon the Out-Line of the Circumference, and from the Points A B; make the Sections E and F; draw the right Lines E F, from the Points B C; make the Sections G H; then draw the right Line G H, from the Intersection and Center I, and from the Interval I A, and from this Center in the Middle of F I G, you may strike your Circle. *Vid.* Fig. 1. and 2.

Practice on the Ground. Fig. G.

This is the same as on the Paper, as does plainly appear from Fig. 5.

PROPOSITION VI.

To strike a Circle on Paper.

Keep the Foot of your Compasses in A, and trace the other Point round, it will make the Circle B C D E. Fig. 3.

Practice on the Ground. Fig. 6.

The same is perform'd by a Line, as was before taught of the Compasses. *Vid.* Fig. 6.

PROPOSITION VII.

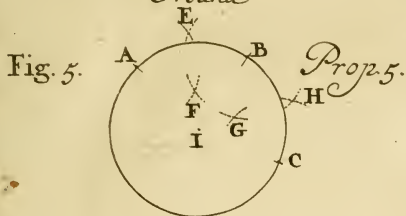
A Spiral Line, tho' it is not properly a Superficies, yet, as it makes by its Voluta something like it, I teach the Method of making it in this Place.

Suppose you would divide the Line L into eight Parts, divide it first into two Parts B I; after that into four Parts of each Side B C, E G, I; divide also B C into two, equally in A, and from the Point A, draw the Semi-circles B C. D E, F G, H I; and from the Point B, draw C D, E F, G H, I L, and that shall be the Spiral Line requir'd. *Vid.* 4. and 7.

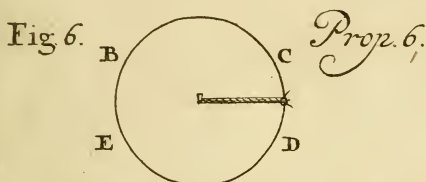
On the Ground. Fig. 7.

The Practice is the same.

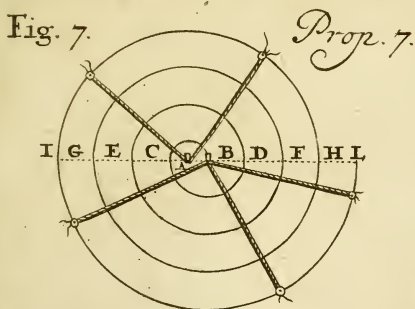
Practice y^e I.st upon the Ground



The II.^d Practice on the Ground



Practice the III.^d



Upon Paper

Fig. 1.

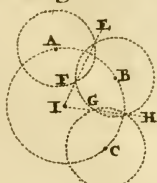


Fig. 2.

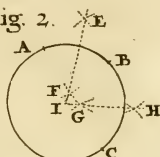


Fig. 3.

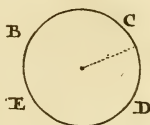
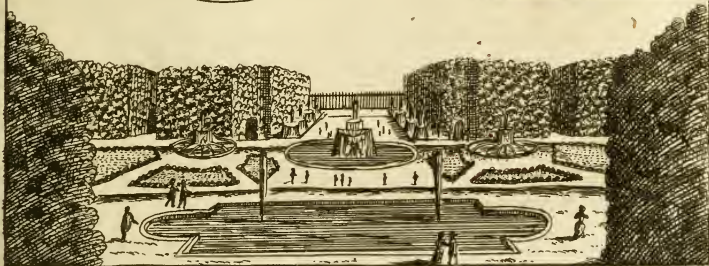
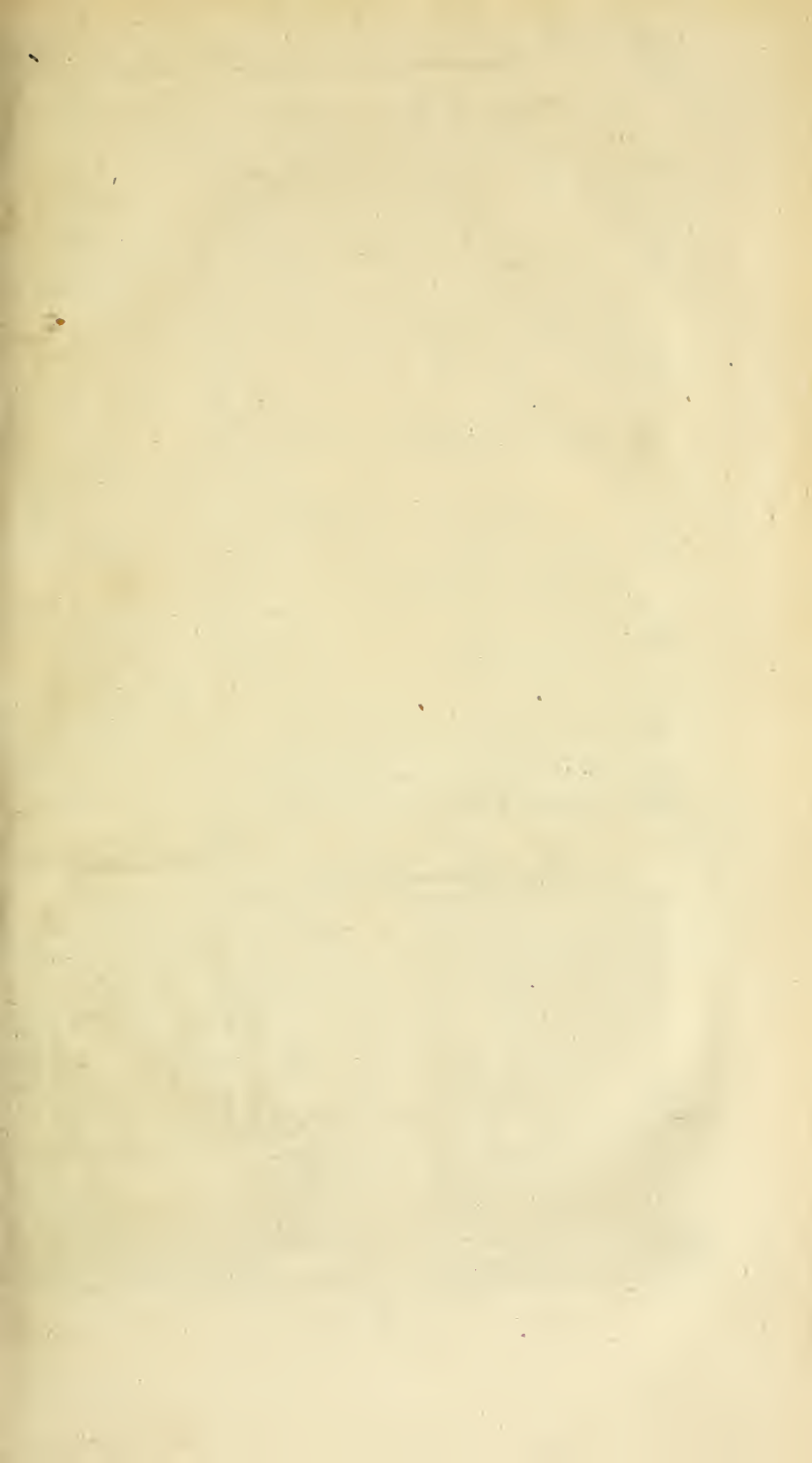


Fig. 4.



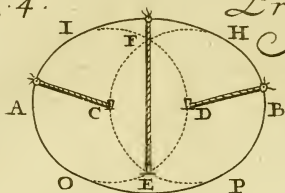




I.st Practice on the Ground

Fig. 4.

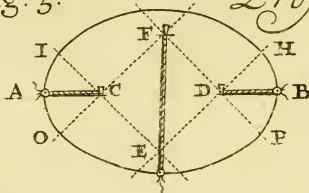
Prop. 7.



II.^d Practice on the Ground

Fig. 5.

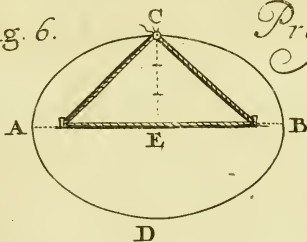
Prop. 8.



III.^d Practice on the Ground

Fig. 6.

Prop. 9.



Upon Paper

Fig. 1.

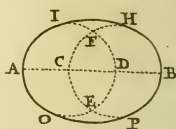
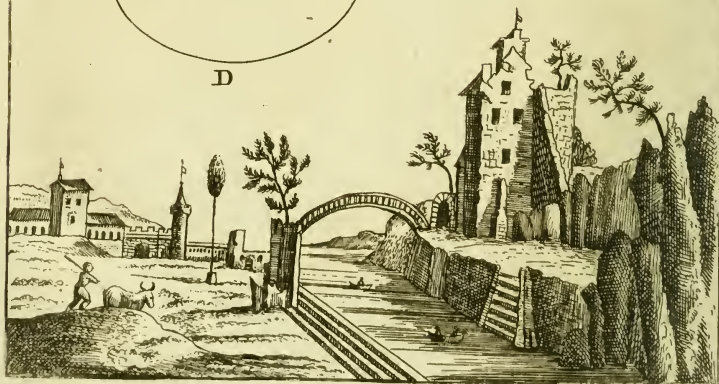
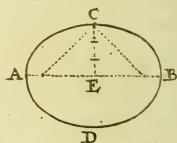


Fig. 2.



Fig. 3.



PROPOSITION VIII.

To describe an Oval upon a Length given.

§ 7. Divide the Length A B into three equal Parts, as in Figure 1; or into four, as in Figure 2, A B C D, and from the Points C D, and from the Interval C A, describe the Circles A E F, B C F, from the Sections E and F; and from the Interval of the Diameter E H, describe the Arches I H, O P, and A I H B P O shall be the Oval requir'd, in Fig. 1. And in Fig. 2, draw only the Diagonal Lines.

The Practice on the Ground

Is so near the same, that the Scheme makes it very plain. *Vide* Fig. 3.

PROPOSITION IX.

To describe an Oval that has two Diameters given; and this is generally call'd the Gard'ner's Oval.

Let the Diameters be A B C D, Lines fix'd at Pleasure; draw the Line A B, and in the Middle of that Line, at Right Angles, draw the Line C, by Intersections, from the Points A and B. Divide the Line C E into three Parts, one Part whereof set off from A, and the same from B; fix there two Pins, and by a Thread you may track out the Oval A B C D. Fig. 3.

Practice on the Ground. Fig. 4, 5.

This is easier done on the Ground, by a Line and Stakes, than on the Paper, by Reason there is more Room; so that your Work is done more easy and more certain; and this indeed is the best Method of laying out any Kind of Oval; for, tho' the first is easier made out on Paper than this last, yet this last is easier laid out on the Ground than the first.

Supposing, then, that the longest Diameter of your Oval be 90 Foot, and the shortest 60, the half whereof, C E, is shorter a Foot, a third whereof is 10 Foot, set off 10 Foot at each End A B, and put down there two Stakes, shall strike out the whole Oval. *Vide* Fig. 5.

We pass now to the Construction of Polygonal Figures.

PROPOSITION X.

To frame a Pentagon upon a given Line.

Suppose the Line BA ; from the End A , and from the Interval AB describe the Arch BCD . Then elevate the Perpendicular AC ; divide the Arch BC into five Parts equally, IDL M N . Then draw the right Line AD , cut the Base AB into two equally in O ; elevate the Perpendicular OE from the Section E , and from the Interval EA describe the Circle $ABFGH$; bring five times the Line AB within the Circumference of the Circle, and you shall have a Pentagon regular, equi-angle, equi-lateral, $ABFGH$, Fig. 1 and 2.

The Practice upon the Ground. Fig. 5.

Is the same, and is particularly useful in Centers and Cabinets of a Garden or Wilderness; for when a Walk runs thro' or into one of them, you must first set off on each Side that Walk half the Width, as you may see on the Ground; and this will be the given Line, as in the Question; from which you may with Ease and Certainty make a proportionable Center or Cabinet. Vide Fig. 3.

PROPOSITION XI.

Within a Circle to make a Pentagon.

The Circle being given, there will not be so much Trouble as there was in the other. Draw then the two Diameters AB , CD , dividing themselves at Right Angles in E ; divide the half Diameter CE into two equally in F , and from the Interval FA , describe the Arch AG from the Point A ; and from the Interval AG describe the Arch GH . The Line AH shall divide the Circle into five equal Parts. Vide Fig. 3.

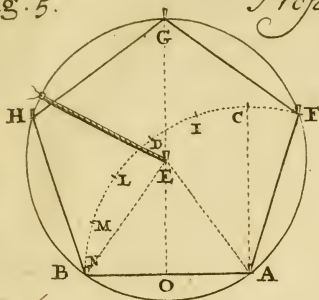
The Practice on the Ground.

Is the same, the Line performing the Part of the Compass. Vide Fig. 6.

Practice the I.st upon the
Ground.

Fig. 5.

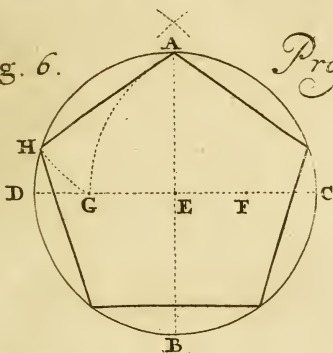
Prer. 10.



Practice the II.^d on the Ground

Fig. 6.

Prop. 11.



Upon Paper

Fig. 1.



Fig. 2.

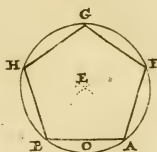
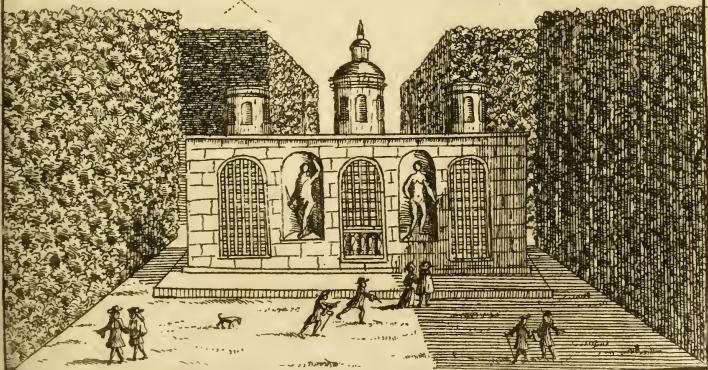
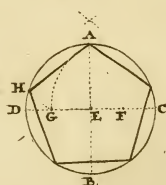
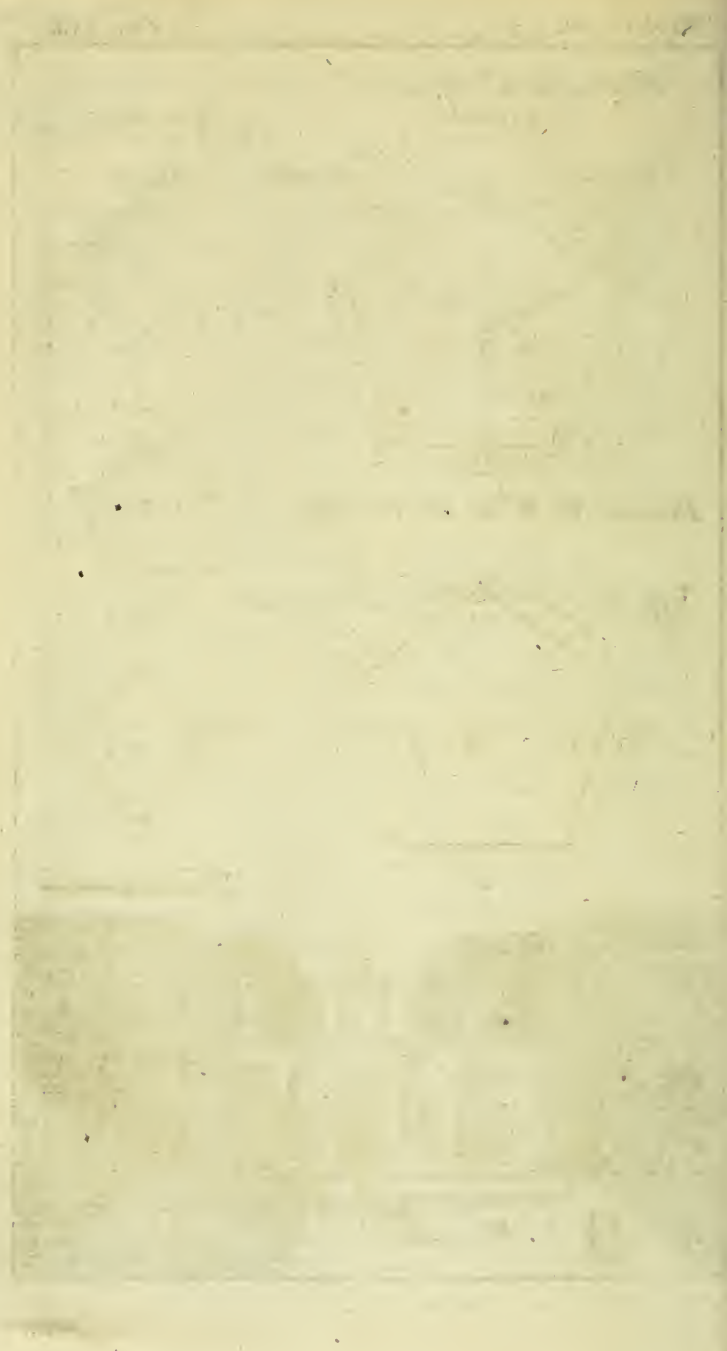


Fig. 3.



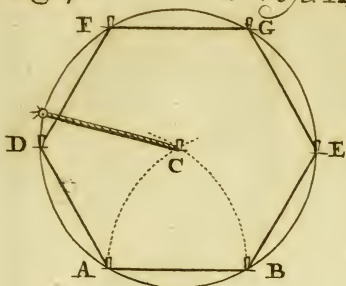




Practice the Ist upon the
Ground

Fig. 4.

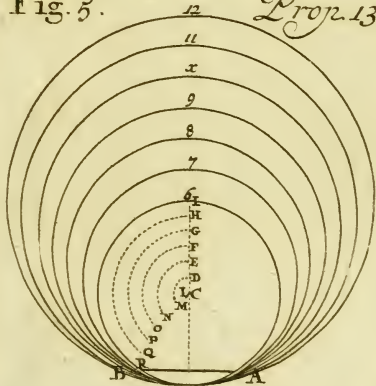
Prop. 12.



The II^d Practice on the Ground

Fig. 5.

Prop. 13.



Upon Paper

Fig. 1.

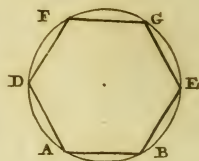


Fig. 2.

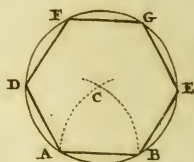
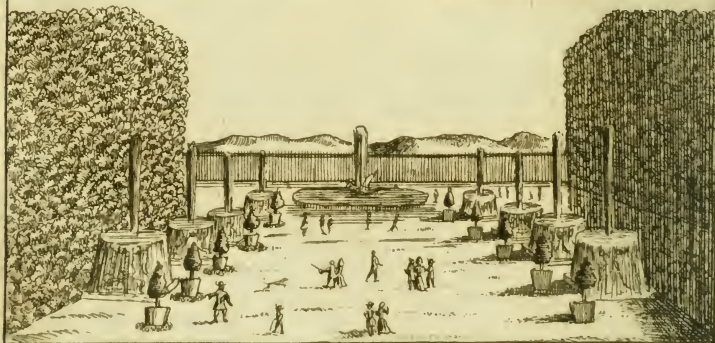
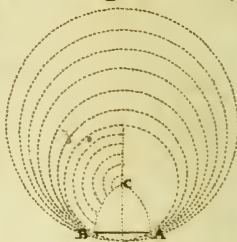


Fig. 3.



PROPOSITION XII.

To frame an Hexagon regular upon a right Line given.

Let A B be the right Line given, from the Ends A and B, and from the Interval A B describe the Arches A C, B C; and from the Section C describe the Circle A B E F G: Bring six times the Line A B within the Circumference, and you shall have an Hexagon regular, A B E F G D, fram'd upon a right Line given, A B. Fig. 1, 2.

N. B. It is to be here observ'd, that the Semidiameter of an Hexagon, is always one Side of it. And this is the easiest to make of all Polygonar-Figures.

This is also the Foundation from which all Polygonar Figures are fram'd, as will appear in Fig. 3.

The Practicē on the Ground

Is every Way answerable to that on the Paper.

PROPOSITION XIII.

The Hexagon being the Foundation, on which all Polygonar Figures are built, here follows a Method, *Upon any right Line given, to describe such a Polygon as shall be requir'd, from an Hexagon to a Dodecagon, or Figure of 12 Sides.*

Cut the Line A B into two equally in O; elevate the Perpendicular O I from the Point B; describe the Arch A C; divide A C into six Parts equally, M N O P Q R; this may make an Heptagon if you will. Then from the Point C, and the Interval of one Part, C M, describe the Arch, D M D, shall be the Center, to describe a Circle capable of containing seven times the Line A B; and so on, of any of the rest, as will more plainly appear by a little Practice. Fig. 3.

The general Method of making and striking out Polygonar Figures being thus fix'd, I shall illustrate and explain it farther by a few Examples, and then leave the Learner to his farther Practice therein.

PROPOSITION XIV.

Upon a Line given, to make a regular Heptagon, or Figure of seven Sides.

We must first suppose the Line A B design'd to make an Hexagon of; because, as is before intimated, the Hexagon is the Figure, from which all Polygonar Figures are made.

After having drawn a Line perpendicular to A B, from the Middle thereof Q, set the Compasses in A or B, and draw the Arch, A C, which divide into six equal Parts, and fixing the Compasses in C, extend them to Part 5; from whence you may describe a little Arch; or rather transfer that Measure on the middle Line to Letter O, and that is the Center of the Heptagon. Having then describ'd a Circle, upon that draw the Lines B A F G H I K, which will make seven Sides, equal to the single one A B requir'd. Fig. 1, 2.

On the Ground

The Practice is the same, and so needs no Repetition. *Vide* Fig. 5.

PROPOSITION XV.

Within a Circle given to inscribe an Heptagon.

Draw half the Diameter I A from the End A, and from the Interval A I describe the Arch C I C; draw the right Line C C, bear the Half, C O, seven times within the Circumference of the Circle, and you shall have the Heptagon requir'd, A m d, B g f e. *Vide* Fig. 3.

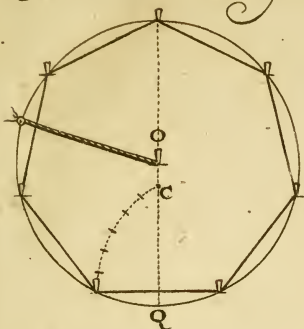
The Practice on the Ground

Is so near the same, that for farther Instruction I need only refer the Reader to the Scheme, Fig. 6.

The I.st Practice on y^e Ground

Fig. 5.

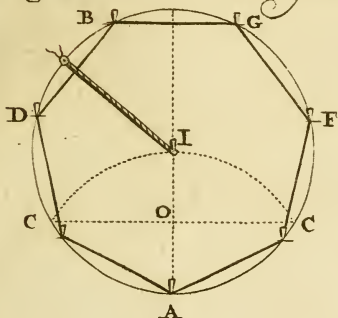
Prop. 14.



The II.^d Practice on y^e Ground

Fig. 6.

Prop. 15.



Upon Paper

Fig. 1.

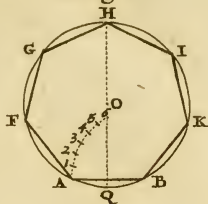


Fig. 2.

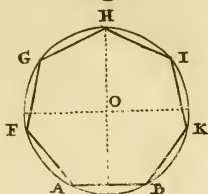
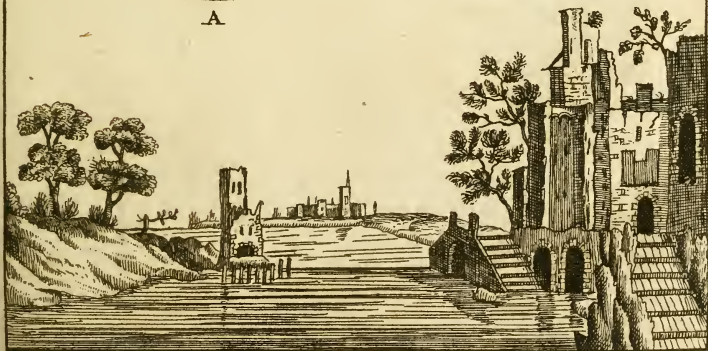
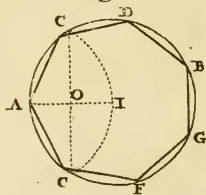


Fig. 3.



Am. Mus. Nat. Hist. 7. 42



Am. Mus. Nat. Hist. 7. 42

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PROPOSITION XVIII.

Within a Circle given, to describe an Enneagon, or Figure of nine Sides.

Let B C D be the Circle propounded, within which one would inscribe an Enneagon.

The Practice upon Paper.

Draw the half Diameter A B from the End B, and from the Interval B A describe the Arch C A D; draw the right Line C D onwards to F; make the Line E F equal to A B. From the Point E describe F G, and from the Point F describe E G; draw the right Line A G, and D H shall be the ninth Part of that Circle. Fig. 1, 2.

The Practice on the Ground

Being done by a Line, as the Practice on the Paper is by Compasses, there is little Occasion to repeat it, but to refer to Figure 4.

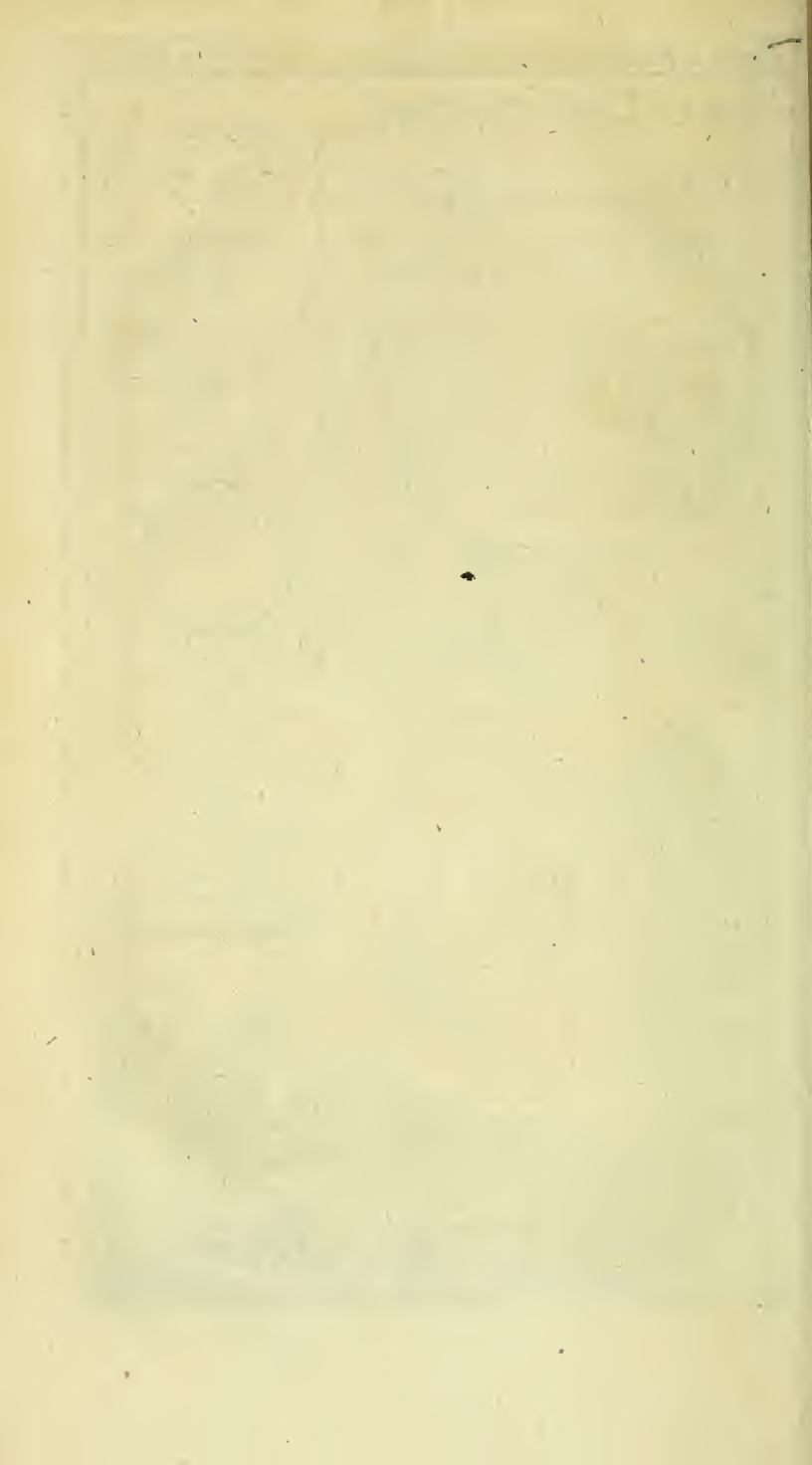
PROPOSITION XIX.

A Line being given, to find the Center of a Circle, and to make an Enneagon, or Figure of nine Sides.

Draw the Line A B, and a Line perpendicular from the Middle thereof, as has been before taught; draw the Arch A O, and divide it into six equal Parts; or, which is less Trouble, take the half of it, and set up to P, which is the Center of this Circle, upon which you are to make this Enneagon, or Figure of nine Sides, every Side being equal to A B. Fig. 3.

The Practice on the Ground

Continues still the same; and from this Rule of an Hexagone, is any Polygonar Figure to 20, 30, or 40 Sides, made upon a given Line; from what has been said likewise of given Circles, may the Side of any Polygon be found; and with this I shall conclude this Point.



C H A P. II.

Numerical Instructions for GARDENERS, &c.

I N T R O D U C T I O N.

IT will not here be expected I should go back to Numeration, Addition, &c. that being in no case necessary, since there are but few that are so mean Proficients in Numbers as to require it: I shall therefore comprehend that little I have to say concerning Numbers in our Way of Gardening, with the *Golden Rule*, or *Rule of Three*, *Rules of Practice*, and with *Duodecimals*, or the Manner of Measuring and casting up Dimensions, &c. useful, as will hereafter be found, in digging, levelling, and accounting the Expences that accrue in Gardening; because in this both Stewards and Labourers are oftentimes at a Loss, and either the Master or Servant is very much the Loser, which is unjust to one, and both unjust and oppressive to the other.

Supposing then that a Gardener is beginning to make his Gardens, (tho' I must confess myself very much an Enemy to the levelling and straining of Nature beyond her due Bounds, that is too often seen in many Undertakings) there are several Divisions. that are absolutely necessary to be levell'd; such are all open Compartments of Parterre, Bowling-greens, Terrace-Walks, and the like, after the Levels are fix'd, as may be seen Fig. 7, p. 9, it will be then a proper Time for him to sit down and consult of his Expence. And how to go the nearest Way to work, preparatory to this, being very well instructed in Addition, Substraction, Numeration, Multiplication, and Division, he ought to learn how to take and cast up Dimensions, whether it be for the Removal of good Earth for planting, or of bad Earth for levelling, raising of Terrace-Walks, Mounts, or the like: And the first Thing is Duodecimals, or Cross-Multiplication; as follows.

Before we go to great Examples, it will be necessary to say something of the Rules of Practice and Cross-Multiplication, by which almost all Questions in this Matter are solv'd; and these two Rules are so interwoven with one another, that they are taught at one and the same Time.

The Learner is first to be inform'd, that by Duodecimals, or Cross-Multiplication, is meant the multiplying Feet, Inches, and Parts, by Feet, Inches, and Parts, without Reduction, which saves a great deal of Labour and Trouble, and is done in fewer Figures.

He is also to understand, that the Rules of Practice shorten even that too, as will by and by very plainly appear. He ought then, first of all, to learn the Aliquot, or even Parts of a Foot, which is also applicable to a Shilling, 12 *d.* being a Shilling, as 12 Inches is a Foot. He is also to learn the Aliquot, or even Parts of a Pound. And these three will direct the nearest Way of casting up any Dimensions or Accounts in Gardening.

Rules of Practice.

d. Inch.

- 1 or 1 is the 12th Part of a Shilling or Foot.
- 2 or 2 is the 6th Part of a Shilling or Foot.
- 3 or 3 is the 4th Part of a Shilling or Foot.
- 4 or 4 is the 3d Part of a Shilling or Foot.
- 6 or 6 is the half of a Shilling or Foot.
- 8 or 8 is the $\frac{2}{3}$ of a Shilling or Foot.
- 9 or 9 is the $\frac{3}{4}$ of a Shilling or Foot.

But as 5 *d.* 7 *d.* 10 *d.* 11 *d.* are not yet number'd, being odd, you must account them thus:

d. Inch.

- 5 or 5 is the $\frac{1}{2}$ and $\frac{1}{4}$ of a Shilling or Foot.
- 7 or 7 is the $\frac{1}{2}$ and $\frac{1}{4}$ of a Shilling or Foot.

d. *Inch.*

10 or 10 is the $\frac{1}{2}$ and $\frac{2}{5}$ of a Shilling or Foot.

11 is always accounted by casting the single Units away as you multiply: For Instance, if you multiply 11 Inches by 26 Foot, it is 26 Foot wanting 26 Inches; which is easily discover'd to be 23 Foot 10 Inches.

8 and 9 Inches or Pence, are likewise wrought by a double Number.

8 Inches by $\frac{1}{3}$ of a Foot twice repeated.

9 Inches by $\frac{1}{2}$ and $\frac{1}{4}$ of a Foot added together. But this whole Matter will be made very plain by the following Examples.

The Aliquot, or even Parts of a Pound.

1 s. is the 20th Part of a Pound.

2 s. is the 10th Part of a Pound.

2 s. 6 d. is the 8th Part of a Pound.

3 s. 4 d. is the 6th Part of a Pound.

4 s. is the 5th Part of a Pound.

5 s. is the 4th Part of a Pound.

6 s. 8 d. is the 3d Part of a Pound.

7 s. 6 d. is the $\frac{3}{4}$ Part of a Pound.

10 s. is the $\frac{1}{2}$ Part of a Pound.

13 s. 4 d. is the $\frac{2}{3}$ Part of a Pound.

15 s. is the $\frac{3}{4}$ Part of a Pound.

When, therefore, you are to multiply any of these aliquot Parts of a Pound with any Sum, you need not reduce, as the Method is too common, but divide by that Fraction.

For Instance, supposing that one Rod of Digging cost 9 d. what will 75 Rod cost? Now, 9 d. being the $\frac{1}{2}$ and $\frac{1}{3}$ of a Shilling, I first say,

	s.	d.
That the $\frac{1}{2}$ of 75 is	— 37	6
and the $\frac{1}{3}$ of 75 is	— 25	0

See that my Answer is — 62 6

Take

Take here a View of all the foregoing Numbers multiply'd by 75.

$$\begin{array}{r}
 1 d. \text{ by } 75 \quad 12 \overline{) 75} \\
 \underline{ 63} \quad \text{which is } \begin{array}{r} s. \ d. \\ 6 \ 3 \end{array}
 \end{array}$$

$$\begin{array}{r}
 2 d. \text{ by } 75 \quad 6 \overline{) 75} \\
 \underline{ 12} \frac{3}{2} \quad \text{which is } \begin{array}{r} s. \ d. \\ 12 \ 6 \end{array}
 \end{array}$$

$$\begin{array}{r}
 3 d. \text{ by } 75 \quad 4 \overline{) 75} \\
 \underline{ 18} \frac{3}{4} \quad \text{which is } \begin{array}{r} s. \ d. \\ 18 \ 9 \end{array}
 \end{array}$$

$$\begin{array}{r}
 4 d. \text{ by } 75 \quad 3 \overline{) 75} \\
 \underline{ 25} \quad \text{which is } \begin{array}{r} s. \ d. \\ 25 \ 0 \end{array}
 \end{array}$$

$$\begin{array}{r}
 5 d. \text{ by } 75 \quad 4 \overline{) 75} \\
 \underline{ 18} \frac{3}{4} \quad \left. \begin{array}{l} 6 \overline{) 12} \frac{3}{8} \end{array} \right\} \text{which is } \begin{array}{r} s. \ d. \\ 18 \ 9 \\ 12 \ 6 \end{array}
 \end{array}$$

In all 31 3

$$\begin{array}{r}
 6 d. \text{ by } 75 \quad 2 \overline{) 75} \\
 \underline{ 37} \frac{1}{2} \quad \text{which is } \begin{array}{r} s. \ d. \\ 37 \ 6 \end{array}
 \end{array}$$

$$\begin{array}{r}
 7 d. \text{ by } 75 \quad 2 \overline{) 75} \\
 \underline{ 37} \frac{1}{2} \quad \left. \begin{array}{l} 12 \overline{) 6} \frac{3}{4} \end{array} \right\} \text{which is } \begin{array}{r} s. \ d. \\ 37 \ 6 \\ 6 \ 3 \end{array}
 \end{array}$$

In all 43 9

Or

Or thus:

4)75

s. d.

$$\begin{array}{r} 18 \frac{3}{4} \\ 3)25 \end{array} \left. \vphantom{\begin{array}{r} 18 \frac{3}{4} \\ 3)25 \end{array}} \right\} \text{which is } \begin{array}{r} 18 \ 9 \\ 25 \ 0 \end{array}$$

In all 43 9

8 d. by 75 3)75

s. d.

$$\begin{array}{r} 25 \\ 3)25 \end{array} \left. \vphantom{\begin{array}{r} 25 \\ 3)25 \end{array}} \right\} \text{which is } \begin{array}{r} 25 \ 0 \\ 25 \ 0 \end{array}$$

In all 50 0

9 d. by 75 2)75

s. d.

$$\begin{array}{r} 37 \frac{1}{2} \\ 4)18 \frac{3}{4} \end{array} \left. \vphantom{\begin{array}{r} 37 \frac{1}{2} \\ 4)18 \frac{3}{4} \end{array}} \right\} \text{which is } \begin{array}{r} 37 \ 6 \\ 18 \ 9 \end{array}$$

In all 56 3

10 d. by 75 2)75

s. d.

$$\begin{array}{r} 37 \frac{1}{2} \\ 3)25 \end{array} \left. \vphantom{\begin{array}{r} 37 \frac{1}{2} \\ 3)25 \end{array}} \right\} \text{which is } \begin{array}{r} 36 \ 6 \\ 26 \ 0 \end{array}$$

In all 62 6

11 d. by 75 2)75

s. d.

$$\begin{array}{r} 37 \frac{1}{2} \\ 4)18 \frac{3}{4} \\ 6)12 \frac{3}{8} \end{array} \left. \vphantom{\begin{array}{r} 37 \frac{1}{2} \\ 4)18 \frac{3}{4} \\ 6)12 \frac{3}{8} \end{array}} \right\} \text{which is } \begin{array}{r} 37 \ 6 \\ 18 \ 9 \\ 12 \ 6 \end{array}$$

In all 68 9

Without

Without the Trouble of multiplying by 9, and dividing by 12, which is the Method taught in most Schools.

But now let us see how many Pounds.

To divide by 20, is thus, (and which is commonly known) strike off the Cypher from the 2 thus, 2|0, and divide the 62 6 by 20

Example.

$$\begin{array}{r} 2|0)62\text{ s. }6\text{ d.} \\ \hline \end{array}$$

The Answer is 3 l. 2 s. 6 d.

In like Manner if any one Thing were to cost 3 s. 4 d. how much will 75 of the same cost? You must then remember, that 3 s. 4 d. is the 6th Part of a Pound; then I refer you to the Work. Divide 75 by 6, thus;

$$\begin{array}{r} 6)75 \\ \hline \end{array}$$

$$12 \frac{3}{4}, \text{ or } \frac{1}{2}.$$

So that the Answer is 12 Pound and $\frac{3}{4}$, or $\frac{1}{2}$ of a Pound, which is 10 Shillings; and that is the Answer, viz. 12 Pounds 10 Shillings.

View the round about Way, and I have done.

First reduce 3 s. 4 d. into Pence, which are 40 d.

$$\begin{array}{r} \text{Multiply } 75 \\ \text{by } 40 \\ \hline 3000 \end{array}$$

divide 3000 by 12 d.

$$\text{thus } 12)3000$$

Then by 2|0)25|0

12 l. 10 s. the Answ.
This

This happens to be a pretty even Number; but here may be seen five times the Figures as are in the practical Way.

Here follow all the Shillings in a Pound under 10 Shillings, us'd after this practical Manner.

$$\begin{array}{rcl} s. d. & & l. s. d. \\ 1 \text{ } 0 & 2|0)75(3 \frac{1}{2} \frac{5}{0} & \text{which is } 3 \text{ } 15 \text{ } 0 \end{array}$$

$$\begin{array}{rcl} s. d. & & l. s. d. \\ 2 \text{ } 0 & 1|0)75(7 \frac{5}{10} & \text{which is } 7 \text{ } 10 \text{ } 0 \end{array}$$

$$\begin{array}{rcl} s. d. & & l. s. d. \\ 2 \text{ } 6 & 8)75(9 \frac{3}{8} & \text{which is } 9 \text{ } 7 \text{ } 6 \end{array}$$

$$\begin{array}{rcl} s. d. & & l. s. d. & l. s. d. \\ 3 \text{ } 0 & 1|0)75(7 \frac{5}{10} & \text{which is } 7 \text{ } 10 \text{ } 0 & \\ & 2|0)75(3 \frac{1}{2} \frac{5}{0} & 3 \text{ } 15 \text{ } 0 & \} 11 \text{ } 5 \text{ } 0 \end{array}$$

$$\begin{array}{rcl} s. d. & & l. s. d. \\ 4 \text{ } 0 & 5)75(15 \text{ } 0 & \text{which is } 15 \text{ } 0 \text{ } 0 \end{array}$$

$$\begin{array}{rcl} s. d. & & l. s. d. \\ 5 \text{ } 0 & 4)75(18 \frac{3}{4} & \text{which is } 18 \text{ } 15 \text{ } 0 \end{array}$$

$$\begin{array}{rcl} s. d. & & l. s. d. & l. s. d. \\ 6 \text{ } 0 & 4)75(18 \frac{3}{4} & \text{which is } 18 \text{ } 15 \text{ } 0 & \\ & 2|0) & 3 \text{ } 15 \text{ } 0 & \} 22 \text{ } 10 \text{ } 0 \end{array}$$

$$\begin{array}{rcl} s. d. & & l. s. d. & l. s. d. \\ 7 \text{ } 0 & 4)75(18 \frac{3}{4} & \text{which is } 18 \text{ } 15 \text{ } 0 & \\ & 10) & 7 \text{ } 10 \text{ } 0 & \} 26 \text{ } 5 \text{ } 0 \end{array}$$

$$\begin{array}{rcl} s. d. & & l. s. d. & l. s. d. \\ 7 \text{ } 6 & 4)75(18 \frac{3}{4} & \text{which is } 18 \text{ } 15 \text{ } 0 & \\ & 8) & 9 \text{ } 7 \text{ } 6 & \} 28 \text{ } 2 \text{ } 6 \end{array}$$

$$\begin{array}{r} s. \ d. \\ 8 \ 0 \ 5 \end{array}) 75 \left(\begin{array}{r} 15 \ 0 \\ 15 \ 0 \end{array} \right) \text{ which is } \begin{array}{r} l. \ s. \ d. \\ 15 \ 0 \ 0 \\ 15 \ 0 \ 0 \end{array} \left. \vphantom{\begin{array}{r} 15 \ 0 \\ 15 \ 0 \end{array}} \right\} 30 \ 0 \ 0$$

$$\begin{array}{r} s. \ d. \\ 9 \ 0 \ 4 \end{array}) 75 \left(\begin{array}{r} 18 \ \frac{3}{4} \\ 15 \ 0 \end{array} \right) \text{ which is } \begin{array}{r} l. \ s. \ d. \\ 18 \ 15 \ 0 \\ 15 \ 0 \ 0 \end{array} \left. \vphantom{\begin{array}{r} 18 \ 15 \ 0 \\ 15 \ 0 \ 0 \end{array}} \right\} 33 \ 15 \ 0$$

$$\begin{array}{r} s. \ d. \\ 12 \ 6 \ 3 \end{array}) 75 \left(\begin{array}{r} 25 \ 0 \\ 18 \ \frac{3}{4} \end{array} \right) \text{ which is } \begin{array}{r} l. \ s. \ d. \\ 25 \ 0 \ 0 \\ 18 \ 15 \ 0 \end{array} \left. \vphantom{\begin{array}{r} 25 \ 0 \ 0 \\ 18 \ 15 \ 0 \end{array}} \right\} 43 \ 15 \ 0$$

$$\begin{array}{r} s. \ d. \\ 15 \ 0 \ 2 \end{array}) 75 \left(\begin{array}{r} 37 \ \frac{1}{2} \\ 18 \ \frac{3}{4} \end{array} \right) \text{ which is } \begin{array}{r} l. \ s. \ d. \\ 37 \ 10 \ 0 \\ 11 \ 15 \ 0 \end{array} \left. \vphantom{\begin{array}{r} 37 \ 10 \ 0 \\ 11 \ 15 \ 0 \end{array}} \right\} 56 \ 5 \ 0$$

It were needless to make any more Repetition on this Matter; if there should be any other Number, 'tis easy, after a little Practice, to use it without the tedious Way of Reduction; so I pass on.

Of Cross Multiplication.

§ 2. These Preliminaries, thus learnt by Heart, the Learner may proceed; and for the understanding this the better, we are to learn this short Table.

That Feet multiply'd by Feet, are Feet.

○ That Inches multiply'd by Feet, every twelfth are Feet, and the Remainder are Inches.

That Inches multiply'd by Inches, every twelfth of the Product are Inches, and the Remainder are Seconds.

This is as far as we use in Gardening; but if any Person hath a Mind to go to a greater Exactness, I refer him to a very exact Treatise, and one of the first that was publish'd on this Subject, entitled,

titled, *Méllificium Mensurationis* ; or, *The Marrow of Measuring*, by *Van Munday*.

Here follows an Example.

$$\begin{array}{r} \text{F. I.} \\ \text{by } 4 \times 3 \\ 5 \times 6 \end{array}$$

4 Foot	by 5 Foot,	is —	20	0
4 Foot	by 6 Inches,	is —	2	0
5 Foot	by 3 Inches,	is —	1	3
6 Inches	by 3 Inches,	is —	0	1 6
			<hr/>	
			23	4 6

But we never use the odd Parts in Gardening, they being of so little Account.

But from this let us go to the more general Use of these two Rules, where we shall see it often made Use of ; I mean the Rule of *Practice*, and the Rule of *Duodecimals*, commonly call'd *Cross Multiplication*.

QUESTION I.

§ 2. *How to measure and cast up any uneven Ground, in a Parterre, Lawn, or such like Division where it must of Necessity be remov'd.*

I must own my self the most averse to the moving of Hills, or filling up of Hollows, imaginable ; but there are several Cases where it is impossible to avoid it, and that is, where
the

the Parterre lies too high for the Floor of the House, which is the Case in many Places, or where the Mold is to be carry'd off, for some good Use.

This moving of Earth, is commonly measur'd by the Foot Measure, and afterwards reduc'd into solid Yards, 27 whereof makes a Yard square, or solid, being 3 Foot long, 3 Foot deep, and three Foot wide.

These Dimensions may be taken, before the Ground is carry'd away, by digging Holes down to the intended Level; but it is generally measur'd afterwards, by leaving little Hills about two Foot wide, to shew the Height the Ground was before the Work was begun.

Let us then put the Case that 'tis such a Parterre, or Lawn, as is describ'd *Fig. 2*, being 360 Foot long, 160 Foot wide, and of the several Depths under-mention'd; these Hills ought to be rang'd out, or judiciously stak'd out, as the Master and Undertaker shall best agree: We will suppose them to be only ten, but in a Peice of Ground of this Extent, there can't be less than 50 or 60; however, these ten will shew the Reason of the Thing as well as 50 or 60.

Let the Depths be, (1) 2 F. 3 In. (2) 1 F. 6 In. (3) 2 F. 1 In. (4) 2 F. 5 In. (5) 1 F. 3 In. (6) 2 F. 7 In. (7) 0 F. 8 In. (8) 0 F. 4 In. (9) 0 F. 3 In. (10) 1 F. 4 In. These added together, will make 14 F. 8 In. Which being divided by 10, the Number of Depths makes near 1 F. 6 In. for the mean Depth of this

this unlevel irregular Peice of Ground: But it must be noted, that when you take these Depths, and find any two Dimensions alike, you are to cast away one of them, because in the Account they make indeed more Figures, but are not of more Value.

But to return, let us now cast up our Dimensions.

F. In.

Multiply ——— 360 0 the Length.
by ——— 160 0 the Width.

$$\begin{array}{r} 21600 \\ 560 \\ \hline \end{array}$$

and ——— 57600 is the superficial Content.
wh. multiply'd by 16

by one Foot 57600
by six Inches 28800

and it makes 86400 the solid Content in Feet.

Let us now divide this solid Content in Feet by 27, the Number of solid Feet in a Yard.

$$\begin{array}{r} 27 \overline{) 86400} (3200 \\ 54 \cdot \cdot \end{array}$$

And the Content is 3200 solid Yards.

The Prices of moving Earth are various,
according to the several Prizes of Labourers
D in

in the Country; but, where they are allow'd 12 *d.* per Day, a Yard of Sand, or other loose Ground, may be dug and fill'd for 2 *d.* $\frac{1}{2}$ or 3 *d.* and of Clay for 3 *d.* $\frac{1}{2}$ or 4 *d.* Upon the whole, if you move it 20 or 30 Yards, it will cost 5 *d.* or 6 *d.* or, if Clay, 7 *d.* or 8 *d.* per Yard. We will suppose the Question in Hand to be 6 *d.*

The Number of Yards 3200
The Price per Yard ——— 6

To reduce it to Shillings } 16 sh
take one half thus, }

Divide that by, 20 ——— } 80 0 0 Pounds.
and the Sum is ——— }

And so much this will cost the levelling.

Q U E S T I O N II.

But there are Pieces of Ground to be reduc'd, which are of irregular Widths, as well as Depths; the Method of measuring of which, will appear Plate 22.

The Widths and Depths being reduc'd into a regular Method, first by fixing some level Stakes round the Edge of the Pit, as a b c d, Fig. 3, Plate 22. These Stakes, I say, being the exact Level the Ground is to be at the Top of the Pit, strain the Line round; and whenever you have a Mind to find the Depths, strain Lines cross-ways likewise, or do

The Gen.^l Scetch of a Building



The Scetch of an Unlevel'd Lawn



The Scetch of y^e hollow of an Irregular Pit

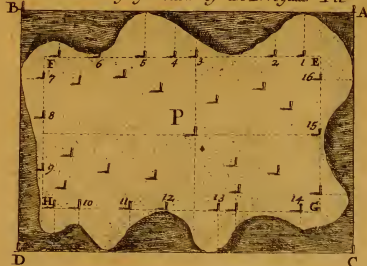


Fig. 5.

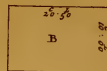


Fig. 8.



Fig. 10.



3
in
1:
le
on
tl
w
pa
E

A

2

J

1

1

do it fighting a-crofs; by which you will discover the middle Stake R (Fig. 3, Plate 22) to be 6 Foot 31 Inches more or less. Supposing then, you have taken the Depths, and reduc'd them as above, you are to set out an exact Square in the Bottom, that will near touch the Irregularities quite round; as suppose e f g h; by which Means, measuring a-crofs at several Places at Pleasure, as at 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, adding all those unequal Numbers together, as you did in the Depths, and dividing them by the Number of Dimensions, suppose 16 more or less, the Question will stand thus, supposing it to be a Hollow, that must be either reduc'd, or quite fill'd up.

F. In.

150 6 long.

103 2 the mean Width.

and 6 2 the mean Depth.

D 2

See

See the Example.

150 F. by 3 F. 450
 150 F. by 100 F. 150
 150 F. by 2 In. 25 . 0
 103 F. by 6 In. 51 . 6
 6 In. by 2 In. 12

150 F. by 3 F. 450

150 F. by 100 F. 150

150 F. by 2 In. 25 . 0

103 F. by 6 In. 51 . 6

6 In. by 2 In. 12

15526 by 6 F. deep 93156

15526 by 2 In. 2587 . 8

6 F. by 7 In. 3 . 6

7 In. by 2 In. 14

15526 by 6 F. deep 93156

15526 by 2 In. 2587 . 8

6 F. by 7 In. 3 . 6

7 In. by 2 In. 14

15526 by 6 F. deep 93156

Divide this 27)95747 . 2(3546 solid Yards.
 by the Num- 147
 ber of Feet 124
 in a solid 167
 Yard.

15526 by 6 F. deep 93156

15526 by 2 In. 2587 . 8

6 F. by 7 In. 3 . 6

7 In. by 2 In. 14

15526 by 6 F. deep 93156

15526 by 2 In. 2587 . 8

6 F. by 7 In. 3 . 6

7 In. by 2 In. 14

15526 by 6 F. deep 93156

15526 by 2 In. 2587 . 8

6 F. by 7 In. 3 . 6

7 In. by 2 In. 14

And this plainly appears to amount to 3546 solid Yards; which, if a Hollow, one would, if possible, avoid filling; as likewise, if it be a Hill, and not in the Way: Supposing you were to lay it into a regular Hollow

Hollow of 145 Foot 6 Inches long, and 106 Foot 3 Inches wide, let us reckon how we shall best order our Matters, that it may be reduc'd into our intended Form, without the Expence of carrying any of it away, or bringing any more in to compleat our Level.

• Were the Sides of this Hollow perpendicular, the finding out a proper Depth would be the easier; but, since there are to be Slopes into the Hollow, it makes some Rebate in the Disposition, and Depth of the Hollow. At first View, then, any Person of the least Experience may see, that this Hollow we have been speaking of, will be about 6 Foot deep; and, according to the common Allowance of three Foot horizontal to one Foot perpendicular, the Basis of the Slope of each Side will take up 18 Foot, and the same at the Ends; supposing you allow the same Horizontal.

This being rightly understood, we ought then to make our Computation from the Middle of one Slope, to the Middle of the other.

You are then first to multiply the Length by the Depth, and divide that by the Number of Feet contain'd in the great Hollow, 18 Foot at each Side and each End for the half Perpendicular of the Slopes; and it stands thus:

D 3

See

See the Operation.

F.	In.
127	6 long:
88	3 wide.

127 Foot by 8 Foot — 1016

127 Foot by 80 Foot — 1017

88 Foot by 6 Inches — 44

127 Foot by 3 Inches — 31 . 9

1

11261 . 10

The Sum of 11261 Feet being the superficial Content of this design'd regular Hollow, (the Inches being rejected, as of little Account) we are in the next Place to divide the Content of the irregular Hollow thereby, and that will give the exact Depth.

As for Example:

11261)95745($8\frac{5659}{11261}$, which is above $\frac{1}{2}$ an Inch.

5659

And by this we see, that this Pit we regularly reduc'd, is to be 8 Foot and a half deep: If it were to be a Hill that was to be reduc'd into the same Method and Figure, the same Calculation would suffice.

Of

Of the measuring of superficial Plans.

In the Course of this Chapter, it will be proper to shew the Method of measuring all Sorts of superficial Figures; not so much for its not being known, as for a Remembrance to all that practise Gardening; since these Things, in a Multiplicity of Business, are apt to slip out of any Body's Mind.

Now, it must be consider'd, that in Gardening, we have Occasion to take and cast up these Dimensions two Ways; first, in the general Survey of a Landskip in Chains, Perches, &c. and them into Acres; and, in a smaller Account, when those Figures are in Grass Plats, into Feet and Inches, and from thence into Yards or Perches. Of both these Ways I shall give Examples.

E X A M P L E I.

Of a Square and Parallelogram in large Land-Measure, Fig. 4, 5, Plate 23.

Let A be a true Square, each Side being 10 Chains 0 Links. Multiply 10 Chains 0 Links, by 10 Chains 0 Links, and the Sum is 1000000; from which cut off the five last Figures, and there remain just 10 Acres for the Square.

D 4

Again,

Again, in the Parallelogram B, let the Side A B, or C D, be 20 Chains 50 Links; and the Side A c, or b D, 10 Chains 0 Links. Multiply a b 20 Chains 50 Links, by a c 10 Chains 0 Links, and it makes 2050000; which is 20 Acres, 50000; but here being a Decimal Fraction, by the cutting off the five Figures, we are (which there was no Occasion of in the last Dimension) to multiply it by 4, and cut off five Figures, and the Figures above five are Roods. Again, to find the Perches, multiply by 40, and the Figures toward the left Hand, above five, are Perches.

See the Operation.

$$\begin{array}{r}
 20 \ 50 \\
 10 \ 00 \\
 \hline
 \text{Acres} \text{ --- } 20 | 500 \ 00 \\
 \hline
 4 \\
 \hline
 \text{Roods} \text{ --- } 2 | 00000 \\
 \hline
 40 \\
 \hline
 \text{Perches} \text{ --- } 0 | 00000
 \end{array}$$

So that the full Sum is 20 Acres, 2 Roods, 0 Perches.

How

How in smaller measuring in Gardening it is used as in the measuring of Grass-Plats and other superficial Figures.

Let A, then, be a true Square of 12 Foot 6 Inches; multiply 12 Foot 6 Inches by 12 Foot 6 Inches, and that gives the Content 156 Foot 3 Inches.

See the Operation:

$$\begin{array}{r}
 12\ 6 \\
 12\ 6 \\
 \hline
 144 \\
 6 \\
 6\ 3 \\
 \hline
 156\ 3
 \end{array}$$

Again, suppose in the Parallelogram B (Fig. 5, Plate 23) the Sides a b, or C D, be 18 Foot 3 Inches, and the Width 12 Foot 6 Inches, as before:

$$\begin{array}{r}
 18\ 3 \\
 12\ 6 \\
 \hline
 186 \\
 3 \\
 9\ 1\ 6 \\
 \hline
 198\ 1\ 6
 \end{array}$$

the

the Content is 198 Foot, 1 Inch, and 6 Parts; but these Parts we generally throw away, except in fine Works.

Of Triangles, (Fig. 3, Plate 23.)

The Content of a Triangle is known by multiplying half the Perpendicular by the whole Base, or, *è contra*, half the Base by the whole Perpendicular; but the Dimensions are taken as the Nature of the Triangle is; and those three Kinds, in Fig. 6, give Light thereinto, being such as all Sorts of Triangles compose.

When you have, then, pitch'd upon the Base, (which in every one of these is A at Right Angles) thereto draw or suppose a prick'd Line to run up to the Angle opposite to it, and that is the Perpendicular.

See the casting up of one of them.

In the first Triangle, the Base c d is 22 Chains, 50 Links; and the Perpendicular f e is 3 Chains 50 Links. See it stated.

$$\begin{array}{r}
 22 \text{ Chains } 50 \text{ Links} \\
 \times 3 \text{ Chains } 50 \text{ Links} \\
 \hline
 66 \text{ Chains } 250 \text{ Links} \\
 66 \text{ Chains } 250 \text{ Links} \\
 \hline
 132 \text{ Chains } 500 \text{ Links}
 \end{array}$$

$$\begin{array}{r}
 11 \ 25 \\
 3 \ 50 \\
 \hline
 56250 \\
 3375 \\
 \hline
 \text{Acres } 3 | 93750 \\
 4 \\
 \hline
 \text{Rood } 3 | 75000 \\
 40 \\
 \hline
 \text{Perch. } 30 | 00000
 \end{array}$$

and so of all the rest.

Now, if we apply this to Gardening, we sometimes have a Grass-Plat of this Kind, or other such like; but the 3d is the Area of a Terrace-Walk, taken at the End. Suppose it then to be the Horizontal Perpendicular and Hypoteneuse of a Terrace-Walk; take, first, the Base 6 Foot 4 Inches, and multiply it by half the Perpendicular of 15 Foot, which is 7 Foot 6 Inches, (for tho' this, as will hereafter appear, is not near the exact Proportion of this Work, yet it will serve to demonstrate our Proposition) and the Content will be 47 Foot 6 Inches:

$$\begin{array}{r}
 7 \ 6 \\
 6 \ 4 \\
 \hline
 42 \\
 2 \ 4 \\
 3 \ 0 \\
 2 \\
 \hline
 47 \ 6
 \end{array}$$

*Of the general Use of Triangles, in measuring
all strait lin'd irregular Plans.*

(Figure the 7th, Plate the 23d.)

It must be here observ'd, that a Triangle measures all irregular Plats, either large or small, by reducing the whole Piece into Triangles, which Triangles are one of the three Kinds last mention'd, and must be so measur'd.

Suppose that *Fig. the 27th, Plate the 23d,* be an irregular Plan, with strait lin'd Sides and Angles (for as for circular or crooked Sides, it is taught in *Fig. 2. Plate 23.*) that is to be measur'd in order to be levell'd, or any other Work common in Gard'ning, and reduc'd into Feet, Inches, &c. and after that into Yards, superficial, or solid, or into superficial Perches; not taking any Notice in this Place of large Land-measure, that being to follow Chapter of Instruments,

Having

Having taken the Plan of it on Paper, reduce it into Triangles, by drawing Lines from one Length to another, and leaving no irregular Square in the whole Work. Being thus reduc'd into Triangles, you are to pitch upon proper Lines for your Base; such indeed are those that are opposite to the widest Angle, then let drop, or you may from thence suppose a perpendicular Line; your Work is just ready to do as you did before, in the Example of Triangles.

There are some that advise the dividing and measuring such Plats in the same Manner you would do a Trapezium; but that is almost the same as this, tho' not so intelligible, nor indeed so exact; I have therefore chose this Way, tho' it is something more Trouble; Yet, where two Perpendiculars have one common Base, as have the Divisions *b* and *c*, *i* and *k*, *b* and *e*, you may add both Perpendiculars together, to save Trouble, and set them down, as in the Example.

I need not farther repeat the Method of taking, or casting up the Dimensions of this irregular Plat; but, in order to find the Content of the whole Field, I suppose the several Dimensions, upon casting up, are as follow:

F. In.

		F.	In.
<i>a</i>	—	96	5
<i>b</i>	}	— 157	7
<i>c</i>			
<i>d</i>	—	76	10
<i>e</i>	}	— 169	1
<i>h</i>			
<i>f</i>	—	92	4
<i>g</i>	—	56	3
<i>i</i>	}	— 155	1
<i>k</i>			
<i>l</i>	—	48	5

In all ——— 882 0 Feet.
96 0 Yards superficial.

Now if you were to find the Content in Perches, you must divide it by 272, when in Feet, as 882.

See the Example.

$$272 \overline{) 8820} \quad (0 \quad 3 \cdot \frac{66}{272} \text{ near } \frac{1}{4}$$

$$66$$

So that you see the Content is 3 Perches, and near a Quarter : This irregular Plat might be taken the same Way as it is in the 2d Figure ; but I leave every one to chuse which they like best.

Let us now proceed to Polygonar, and Circular Figures.

To

To find the Content of a Circle, or any Part thereof.

To find the Content of a Circle, one Way is, after you know the Diameter, to work by the Rule of Three, and say, as 7 is to 22, so is the Diameter to the Circumference; and then you are to multiply half the Diameter by half the Circumference, to find the Content.

But a better Way is to square the Diameter, and say, as 14 is to 11, so is the Square of the Diameter to the Content of the Circle.

Suppose, then, that the Diameter of the Circle A B, &c. Fig. 8. Plate the 23d, be 20 Foot, that 20 Foot multiply'd by itself, viz. 20 Foot, makes 400; say then, as 14 is to 11, so is the 400 to the Content of this Circle.

See the Work.

$$\begin{array}{r} 14 \quad 11 \quad 400 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 400 \\ 400 \\ \hline 14)4400(314\frac{4}{7} \text{ above } \frac{1}{4} \end{array}$$

$$\begin{array}{r} 20 \\ 60 \\ \hline 4 \end{array}$$

So

So that the Content is 314 Foot and above a Quarter.

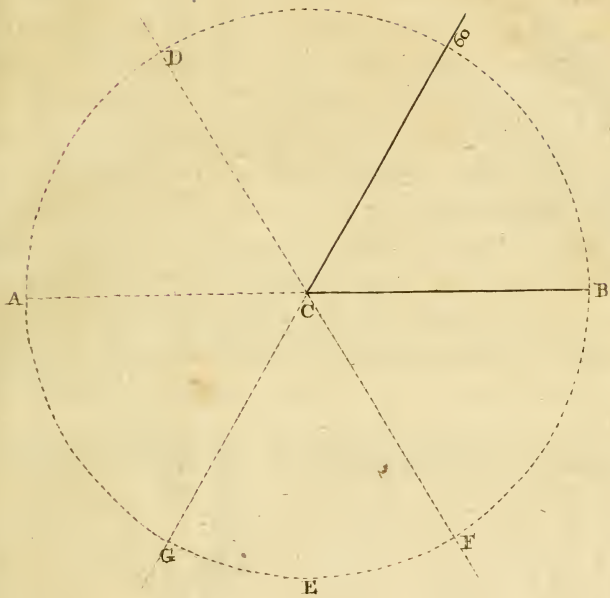
A Semicircle and Quadrant, or any Segment of a Circle, are measur'd the same Way that a whole Circle is, *viz.* half the Diameter, or Perpendicular, by half the Compass. In the foregoing Circle, if you would know the Content of that little Piece D C B. the Arch D. B. is 78 Foot and a Half, the half of it is 39 and a Quarter, which multiply'd by 100, the Semidiameter gives 3925 for the Content, and so of a Quadrant, &c. And it must be noted that all these Figures are in Use in Gardening; we break Circles, Semicircles, and Quadrants out of our Squares, for the greater Diversity and Ornament thereof; but, because it would be a Trouble to find the Diameter of the Segment of a Circle at all Times, I shall shew

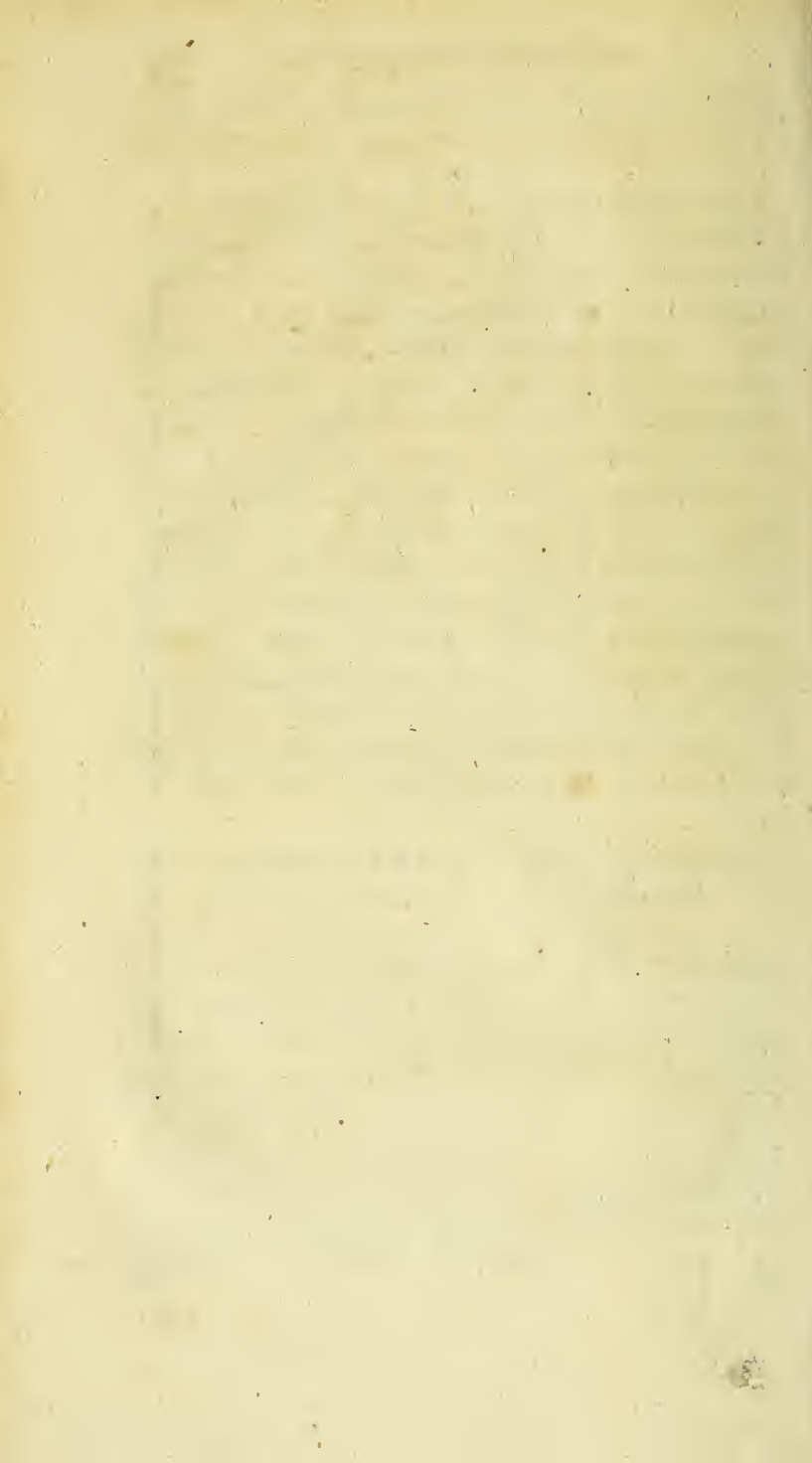
How to find the Content of the Segment of a Circle, without knowing the Diameter.

Let E F G be the Segment; the Subtense, or Chord-Line, is 170 Foot, the Perpendicular G H 50 Foot; now multiply $\frac{2}{3}$ of the one by the whole of the other, and the Product will be the Content.

The $\frac{2}{3}$ of 170 Foot is near 113, which multiply'd by 50, produces 5650 superficial Feet; and that is the Content of that Segment, Portion, or Part of a Circle.

To





To find the superficial Content of an Oval.

The common Way is to multiply the long Diameter by the shorter, and from that Product to extract the Square-Root, which you may call a mean Diameter, and then, as if you were measuring a Circle, say,

As 14 is to 11, so's the mean Diameter to the Content of the Oval; but this is not exact. A better Way is 1.27, that as 1 $\frac{27}{100}$ is to the Length of the Oval, so is the Breadth to the Content thereof. We may go nearer, by making the Fraction larger, and say, as 1.27324 is to the Length, so is the Breadth to the Content: But the first is near enough to our Purpose in Gardening.

Let an Oval, then, be 50 Foot long, and the Breadth, or shortest Diameter, be 37. Say as follows:

As 1.27 is to 50 so is 37 to the Content:

$$\begin{array}{r}
 \hline
 37 \\
 350 \\
 150 \\
 \hline
 127)1850 : 00(1466 \\
 \cdot \\
 580 \\
 720 \\
 850 \\
 \hline
 88
 \end{array}$$

E

So

So that as 1.27 is to 50 the Length, so the Breadth 37 is 1456 Foot, the Content.

The Reason why I have, in the Dividend of this Sum, added two Cyphers, is to make it equal to the two Fractions in the Divisor; and this I particularly advise the Reader of, because he is not, perhaps, very well skill'd in Decimal Division of Feet and Parts, by Feet and Parts. But if there had been five Figures in the Fraction of the Divisor, I should likewise have added five Cyphers in the Dividend, to ballance it. And thus much of circular Figures.

How to find the superficial Content of regular Polygons, as Pentagons, Hexagons, Heptagons, &c.

Multiply half the Sum of the Sides by a Perpendicular let fall from the Center upon one of the Sides, and the Product will be the Area, or superficial Content of the Polygon.

In the following, the Sides B C suppose to be 84 Foot, the Sum of the Sides 5, the Work will stand thus :

The Half of 420, which is the Product of 84 by 5, is 210; and this 210 multiply'd by 56 Foot, the Semi-diameter, or, as it is generally here call'd, the Perpendicular, gives 11760 Square Foot for the Content thereof. And this Way will measure any Figure, let it be

6, 7, 8, 9, 10, or more Sides ; so that I need not enlarge more on it.

I shall only give one Example more of Compound Figures, which are us'd very much with us in Gardening. Let it be Figure the 10th, Plate the 23d, compos'd of a Square and a Semi-circle at each End.

Having already taught how to measure a Square and a Semi-circle, there is the less Occasion to enlarge here. First measure the Square, and then the two Semi-circles, and adding them together, it gives the Content.

Thus the Length $a b$, or $c d$, 100 Foot, multiply'd by $a c$, or $b d$, 60 is 600, and the Semi-circles 196 Foot, make in all 796 Foot superficial in the *Area* of that Compound Figure.

I shall now finish this Chapter with a short Sketch of a Measuring-Book Abstract, and of a Bill, or Computation of Work to be done by any Gardener, &c. which are the original Foundation of Minutes for a Bill, or Contract, and for the Scheme and Schedule thereto commonly annex'd.

You are then, upon the Paper, if it be for an Estimate, or upon the Ground, if the Work be done, and it be a Bill, and not an Estimate, to measure the Length and Breadth of every Particular ; and cast up, and place all the Dimensions in a correct Method, that you may the easier abstract them into general

Heads, and cast them up into a Bill: You are likewise to place the Sketch, or Draught of the principal Part of your Garden upon a very small Scale, (*Vide* Plate 22) that thereon you may place Letters to refer to upon any Occasion, and to demonstrate the Place where such Work was done, and the several Distances that Earth was mov'd; for otherwise, should there happen to be a Suit of Law, (which is the Case too often) the Matter can't be so well understood.

The Nature of a Measuring-Book.

First divide your Octavo Leaf into six Parts, or Folds, one whereof is for the Margin, one for the Dimension taken, one for the Contents, and the other to explain the Place and Distance of every particular Work. This being done, title your Book thus :

Sept. 14, 1714. The Menfuration of several Works done (or to be done) for the Right Honourable the E— of ———, at *Bellean* in *Com. Linc.*

The Earth fleec'd off the
Plan of the Courts Building,
and Terrace-Walks, and cart-
ed to a Lestal at A, the mean
Distance of carting being
from B to A, Plate 23, Fig.
1, 1000 Foot.

F. I.		F. I.
620 0	}	8726 0
380 0		
1 0		

The

The levelling and carrying away of the hilly Ground from the Lawn at N, Fig. 2, Plate 22, to the Terraces on each Side the mean Distance, 100 Foot:

F.	I.	F.	I.
360	0	86400	0
160	0		
1	6		

The filling up a large Pit in the Garden mark P, with Clay dug, and brought from the Foundations of the House, the mean Distance being 100 Foot.

150	6	95745	0
103	2		
6	2		

The rough levelling of the two Courts L and N.

(2)	200	0	64000	0
	100	0		
	1	0		

The rough levelling the Garden mark'd M, Fig. 1, Plate 23.

220	0	38940	0
107	3		
1	0		

The rough levelling of the great Court before the House Northward, mark'd B.

230	0	120750	0
210	0		
2	6		

The rough levelling of the great Terrace-Walk on the South Side of the House, mark'd o.

640	0	94000	0
100	0		
1	6		

The rough levelling of the upper Parterre on the <i>South</i> Side of the House, mark'd Q.	F. I. 240 0 } 200 0 } 1 6 }	F. I. 72000 0
---	--------------------------------------	------------------

The rough levelling the lower Lawn, or Par- terre, on the <i>South</i> Side of the House, mark'd R.	250 0 } 180 0 } 1 0 }	45000 0
--	-----------------------------	---------

The trenching the Quarters mark'd S S, &c. and throwing the Mold out of the Walks two Spit deep.	(2) 600 0 } 180 0 }	216000 0
--	------------------------	----------

The earthing, raking, and turfing the Par- terre Quarters, mark'd a a a a.	(2) 210 0 } 70 0 }	29400 0
---	-----------------------	---------

The earthing, raking, and turfing the Lawn, or lower Parterre of Grass.	250 0 } 180 0 }	45000 0
--	--------------------	---------

The turfing the Side Terrace-Walks, mark'd b b b.	(2) 620 0 } 70 0 }	86800 0
---	-----------------------	---------

The middle Gravel- Walk.	2400 0 } 40 0 }	96000 0
-----------------------------	--------------------	---------

The

F. I.

The gravelling the	}	640 0	}	F.	I.
great Terrace.		40 0		25600 0	

The Gravel-Walk at	}	640 0	}		
the lower End of the		30 0		19200 0	
Parterre.					

The Walk at each	}	200 0	}		
End of the Parterre.		30 0		6000 0	

There are many other Dimensions that occur in an Undertaking ; but these, I think, are sufficient Specimens of what I would pretend to teach by this Section. I shall now proceed to abstract those Dimensions into general Heads ; wherein I must observe, that all Dimensions of Clay, or any other Material in Gardening, are brought into one Head, if the Distance of Carriage be the same ; as is also rough levelling, turving, &c. when they are of one and the same Kind.

Divide, then, a Page, or Pages, at the End of your Book, into six Folds, one more or less may do, but so as they may contain the Contents of any of the foregoing Dimensions, and proceed thus, beginning at the Beginning of your Dimensions.

An Abstract of the several Particulars of this Mensuration.

Mold dug and Roughlevelling.	Trenching.	Earthing, raising, and turving.	Gravel-Walks.
F. I.	F. I.	F. I.	F. I.
8726 0	216000 0	29400 0	96000 0
323 solid Yards	24000 0 Yards superficial.	45000 0	25600 0
Coarse Earth and Clay dug and mov'd, 100 F.	794 $\frac{1}{2}$ or, 4362 Perches superficial.	86800 0	19200 0
86400 0	378690 0	161200 0	6000 0
95745 0	14029 solid Yards.	9922 Yards.	146800 0
182145 0		or, 597 Perches.	540 0 superficial Perches
6746 sol. Yds.			

The

The several Sums being thus brought into proper Heads, these Heads are the Articles for an Estimate, or Bill, and, after that, for Articles; and, as soon as they are plac'd in Order, and cast (as before) the Contents in Feet is then given; and then, being divided, is brought into solid or superficial Yards, or into Perches; which three Measures are, for the most Part, what the Gardeners reduce their Work to; and for that Reason I shall here subjoin a Table, *viz.*

9 Foot is a superficial or square Yard.

27 Foot is a solid Yard.

272 Foot $\frac{1}{2}$ a superficial Perch.

As for solid Perches we use them not.

There are, indeed, in several Counties of *England*, Measures that differ from these already nam'd; the *North Country* Fall, or Rood, is 7 Yards, or 21 Foot, and that a fourth Part of their Acre, as they call it, *viz.* 28 Yards; but there is little Occasion for me to run into these Divisions, since they are easily brought to bear with those afore-mention'd.

Of a Bill, or Estimate.

A Bill, or Estimate, depends on the Nature of the Earth, or Clay, &c. you have to work on, and on the Distance you move it; as for Depths, they are adjusted in casting up the Dimensions; and as for the Distance
of

of Carriage, when we say a mean Distance, 'tis a Length taken from the Middle of the Place where we take it from, to the Middle of the Place where we carry it to.

The Form of a Bill, or Estimate.

A Bill of several Works done for the Right Honourable the E— of ———, at *Belleau* in *Com. Linc.* 1715.

For 323 solid Yards of good Mold, fleec'd off from the Surface of the Buildings, Court-Yards, &c. and carry'd to a Legal 1000 Foot Distance, at 8 d. per Yard. —————	}	<i>l. s. d.</i> 10 14 8
--	---	--

For 6746 solid Yards of coarse Earth and Clay, dug out of the Foundations of the House, and other Places, and carry'd to a large Pit in the <i>West</i> Court, and to raise the Terraces at each Side of the Parterre; the mean Distance of carting being 100 Foot, at 8 d. per Yard. —————	}	224 17 4
---	---	--------------

For 14029 solid Yards of Ground rough levell'd, and some of it carry'd 20, 30, or 40 Foot Distance, at 2 d. $\frac{1}{2}$ per Yard: —————	}	16 18 2
---	---	-------------

For

for GARDENERS, &c. 59

For 794 Perches and an half } l. s. d.
 superficial of trenching at two
 Spit deep, leaving the Crumbs, } 13 4 10
 at 4d. per Perch. —————

For 597 Perches of Turf, or
 Swath-Grass, (laid down at the
 Work) accounting molding, ra- } 24 17 6
 king, laying, and cutting it, at }
 10s. per Perch. —————

For spreading, laying, raking,
 and rolling six times over of 540 }
 Perches of Gravel, at 6d. per } 13 10 0
 Perch, the Gravel being ready }
 dug and carted. —————

I might in this very Section have been ve-
 ry large and copious; but I could not see the
 Necessity of it, seeing these small Intimati-
 ons will be sufficient for any Person that has
 any Thing of a Genius; as for those that
 have not, though they are Gardeners, other
 Kind of Works are more proper for them;
 so I proceed to the next Chapter of this Trea-
 tise, viz. *Instrumental Instructions for Garde-
 ners.*

C H A P.



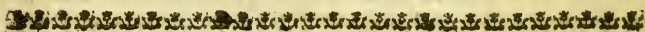
C H A P. III.

Of the Use of SURVEYING INSTRUMENTS.



Gunter's Chain.

§. I. **T**HIS is the Chain that is generally made Use of by Surveyors, and contains in Length four Poles, or 66 Feet, and is divided into 100 Links; each Link is therefore $7\frac{2}{3}$ Inches. This Chain is, for greater Ease in reckoning, divided into ten Parts, by proper Brasses, denoting 10, 20, 30, 40, 50 Links, and back again from 50 to 10 Links.



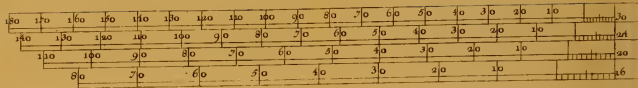
The Surveying Scales.

FIG. I.] **T**HE Scale more particularly adapted to Surveying, is on one Side divided into six equal Parts, each of which Parts answers to a *Gunter's Chain* of 100 Links: At the End of this Scale is an equal

A Diagonal Scale of Equal parts.



Fig. II.

A Scale of Equal Parts.

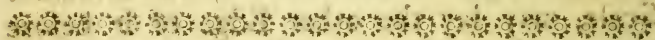
equal Part, divided by Diagonal Lines into ten Parts; each of which correspond with the Divisions of ten Links in the Chain. This Subdivision is number'd on the Sides, 2, 4, 6, 8, and in the same Manner on Top. If you imagine the Top Figures to denote Units, and those on the Side Tens, 'tis then plain, that, if the Compasses be extended from the Point where the sixth Line intersects that noted 3, to the Point where the Line denoting 70 is intersected by the said 6th Line, that Distance shall be three Chains, 76 Links. This appears yet more plainly by the Dots made in each Point. Those who would project a Field in a fourth Part of the Compass by which it might be laid down by the aforesaid Scale, may lay the other Edge of it before them, where they may see the five former Divisions divided into 10, and at the End one of them Decimally divided, as one of the other was. For Example, If you would take the Distance of 7 Chains, 52 Links, extend the Compasses from the Point where the 2d Line intersects the 7th, to the Point where the Line denoting 50 is intersected by the said 7th Line. This appears plainer still by the Dots.

FIG. 2.] There are also other Lines of equal Parts, which may be us'd in Surveying, as *Fig. 2*; One of them is divided into 180 Parts, and has before it a Part Decimally divided; and it is figur'd 30, intimating that 30 of those Decimal Parts are equal to an Inch.

Hence

Hence the Line is call'd the *Line of 30 in an Inch.*

These Lines may be made Use of where you have a large Piece of Ground to protract, because each Division is equal to 10 Yards, Feet, or Chains, &c. Thus you see, that the Measure of 20 Chains, 60 Links, extends from the Dot on 20 to the 6th Division in the Part Decimally divided. But, as these Lines are more immediately useful in laying down and measuring Lines for Triangles, I pass them over, with this farther Remark, That against the other three Lines are figur'd 24, 20, 16, denoting that one of their Parts is decimally divided to 24, 20, 16 Parts in an Inch.

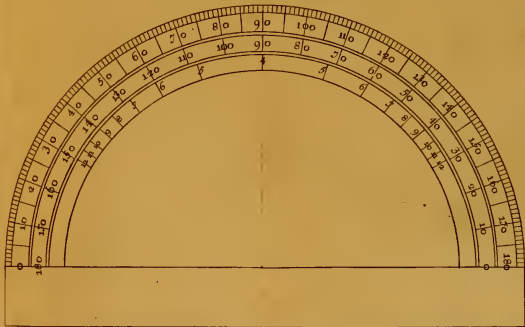


PROTRACTORS.

FIG. 3. THESE Instruments are of two Sorts: one represents a Semicircle, or half Theodolite; the other, a Parallelogram, or long Square.

The Protractor representing a Semicircle, is divided in the Limb, or Semicircle, into 180 equal Parts, or Degrees; those Degrees are number'd backwards and forwards, from 1 to 180, in two Semicircles; the Center of these Divisions is a little Notch, or Hole, made in the Line passing thro' the two Points of 180 Degrees; and therefore 'tis easy to imagine, that the two semicircular Divisions represent the

Fig. III.
The Semicircular Protractor.

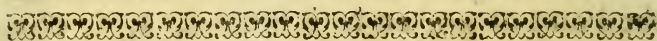


the whole Theodolite ; and the three Points of 90 and 180 Degrees, by moving the Instrument about its Center, may give the four Cardinal Points of East, South, West, and North, *ad libitum*. Within the two Semicircles is a third, having several Divisions number'd from the Point of 90, on both Sides 4, 5, 6, &c. to 12. Their Use is for the ready Division of a Circle into 4, 5, or 6 Parts, &c.

FIG 4. Let $A D B$ be the Semicircle, $A C B$ its Diameter, C the Central Point. On $C B$ I would make an Angle of 60 Deg. 'tis easy to see that the Diameter of the Instrument must be plac'd on $C B$, and its Center at the Point of the Angle ; if you count 60 Degrees from B , and prick 'em off in your Paper ; and thro' C , and that small Hole, draw $C 60$; 60 $C B$ shall be an Angle of 60 Degrees, if you would have the same Angle to the left of your Instrument, it remaining in the same Posture, prick off 60 Degrees from A , and draw $C D$.

But where the Theodolite gives the Angle in another Circle $A E B$, 'tis also easy to see that $A C B$ represents the Diameter of the Instrument, and $A E B$ the Semicircle ; and, admitting the Index of the Theodolite cut 240 Degrees, reckon'd from A , that Quantity being 60 Degrees above a Semicircle $A D B$; prick off 60 Degrees, reckon'd from B or A , (according to the Circumstance of your Work) and draw $C F$, or $C G$.

If you would divide a Circle, suppose into six Parts, the Diameter of the Instrument being laid on any Line, A C B, and its Center on C, prick an Hole against the two Divisions noted 6, on both Sides; and 'tis done.



The Plain Table:

THIS Instrument is usually 15 Inches long, and 12 broad, and is made to fix on three Legs, by a Ball and Socket fitted to a Nofil in the Table. On the jointed Frame on both Sides of it are several Lines. On one Side the Line, next the Table, is an Inch-Division; the next, a Tangent Line, consisting of 4 Ninety's, centring in the Brass Hole in the Middle of the Instrument; and the outermost Line is also a Tangent Line, divided into 360 Parts or Degrees, and each 10 Degrees to 30 Minutes; and has the same Center as the preceding Line. On the other Side of the jointed Frame, the Division next the Instrument, is also an Inch-Division, decimally divided; and the two next are Tangent Lines, consisting of 180 Degrees, and the outermost of them decimally divided, and each Degree into two thirty's of Minutes. These Lines have for their Center a Brass Hole, inclining to a Side of the Table; and therefore in the Use of them, the Frame must be so plac'd, that a Line passing from the Beginning to the
End

End of them, shall also cut the said Brass Hole.

Box and Needle.

To one of the Sides of the Instrument is fix'd a Box, with a Chart containing a circular Division of 360 Degrees, subdivided into the 32 Rhumbs, or Points of the Compass, and against each Point is its Name. The magnetic Needle plays on a Pin in the Center of the Chart. This Needle, when well touch'd by the Load-stone, always regarding the North and South Points; you are therefore to move your Instrument about, 'til you observe the Needle to hang over the North and South Line of the Chart, and then is your Table due East and West, North and South.

The Instrument being thus truly plac'd, you are then enabled to take the Number of Degrees, which any Object makes with your Center in the Instrument, and to protract them at any Time, in Case the Weather be bad when you Survey.

The Index.

'Tis a Piece of Wood of two Foot long, and about one Inch $\frac{8}{10}$ broad, having a fiducial Edge, for better drawing Lines with Ink; to each End belongs a perpendicular Sight, for cutting Objects with, and finding Angles. On this Instrument are usually laid down Lines of Chords to two Radii; and next those, Lines
F of

of equal Parts, such as we have describ'd; and next them a Surveying Scale, such an one as is also describ'd. The Edge of this Instrument is to go thro' the Centers before spoken of, or any assign'd Center on the Table.

The Use of the Plain Table.

The Figure that is most usually produced, on taking a Survey, is an irregular Polygon, having no Side parallel to its Opposite, nor any Side or Angle, corresponding with any other Side or Angle, and is call'd a Trapezium.

FIG. 5. Let the irregular Polygon or Trapezium A B C D, be a Field to be survey'd.

Place your Table horizontally, (or parallel with the Earth) in any Part of the Field, as at E; so that standing there, you can see to each Angle A B C D; having a Sheet of clean Paper on your Table, and assuming any Point thereon, imagine it E, in E fix a Pin, and placing the Edge of the Index close thereto, direct your Sights to Angle A, and then draw the occult Line E A; do so by the other Angles, and draw E B, E C, and E D. This being done, let two Persons set out with the Chain from E towards A, the Foremost provided with six, or more, sharpen'd Sticks or Irons of a Foot long each, and let them measure E A thus. Cause the foremost Person to go one Extent of the Chain; suppose
to

of equal Parts, such as we have describ'd ;
and next them a Surveying Scale, such an one

a

n

o

c

h

a

t

f

l

l

c

s

i

f

c

a

f

l

v

l

Sticks or Irons of a Foot long each, and let
them measure E A thus. Cause the foremost
Person to go one Extent of the Chain ; suppose
to

to F, let him move about to the right or left, 'til you standing at your Instrument, and looking thro' the Sights to A; observe the Man to come to Point 6, in the Line E A; E O being one Chain, let him place a Stick there, and proceed on towards A, imagine to H, where being stopp'd by the hinder Person's Arrival at G, let the hinder Person take up the Stick, and being brought as before to I, in Line E A; let him place a Stick, the hindermost Person takes up the Stick at G, and then suffers the foremost to proceed A; which is another Chain's Length, so that E G, G I, and I A, are just three Chains.

Set against A, Column-wise in this Manner three Chains.

<i>Angles</i>	<i>Measures.</i>	
	<i>Ch.</i>	<i>Lines.</i>
A	3	
B	2	14
C	2	51
D	1	90

Lines E B, E C, and E D, being measur'd in the same Manner, suppose E B 2 Ch. 14. Li. E C 2 Ch. 51. Li. and E D 1 Ch. 90 Li. Tabulate them as above.

Now repair to your Surveying Scale, and, as has been taught, take off 3 Chains, and set that Distance from E to A; set 2 Ch. 14 Li. from E to B, and draw A B; set 2 Ch. 51. Li.

F 2

Li.

Li. from E to C, and 1 Ch. 90 Li. from E to D, and draw B C, C D, and D A. Lastly, directing the Sights, the Edge of the Ruler on E, to the Middle of the Gate of the Field; draw E K, and on A D, draw the Gate at K: In the same Manner may any other observable in the Hedges be laid down.

To find the Content of this Trapezium.

From the two Angles most remote from each other, A C, draw the Base Line A C, take it in your Compasses, and setting it on your Scale, 'twill reach from the Point of 5 Chains to the Point of 25 Links amongst the Diagonals. Set 5 Chains, 25 Links on A C, draw B S, and D S, perpendicular to A C; B S taken from the Scale is, 1 Ch. 25 Li. and D S is also 2 Ch. 56 Li.

To find the Content of this Field.

Multiply half the Base A C, by the Sum of the two Perpendiculars B S, and S D, without having any Regard to their being Decimals, and cutting off 5 Figures of the Product to the right (because 1,00000 square Links makes an Acre) the remaining Figures are Acres.

Multiply those 5 Figures by 4, (4 Poles being an Acre) and cutting off 5 Figures, as before, the remaining Figures are Roods; multiply those 5 Figures by 40, cutting off 5 Figures

gures as before, and the remaining Figures are Perches.

Operation.

$$\begin{array}{r}
 \text{Base A C} - 5 \ 25 \text{ Perpendiculars} \left\{ \begin{array}{l} 1 \ 25 \text{ B S} \\ 2 \ 56 \text{ D S} \end{array} \right. \\
 \hline
 \frac{1}{2} - 2 \ 62 \\
 \hline
 3 \ 81 \\
 2 \ 62 \\
 \hline
 762 \\
 2286 \\
 762 \\
 \hline
 \text{Acres} \ . \ 99822 \\
 4 \\
 \hline
 \text{Roods} \ 3)99288 \\
 40 \\
 \hline
 \text{Perches} \ 39|71520
 \end{array}$$

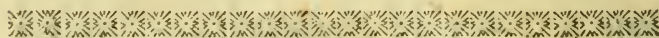
So that the superficial Content of the Trapezium, is 0 Acres, 3 Roods, 39 Perches, $\frac{7}{10}$ of a Perch.

If you would know the North and South Lines of this Field, The Instrument remaining in Point E, place the Table, so that the Needle hang directly over the Points of North and South in the Box, then is the Table in the same Position; and if, thro' Point E, you by the Help of any Line, on the Frame draw a Line parallel to that Line, it shall also lie parallel with the Needle, and be the

F 3

true

true North and South Line; to this Line at right Angles, at Point E draw another Line, for the Line of East and West.



The THEODOLITE.

AS the Horizon (which is a great Circle of the Sphere) is, according to the best of Observations, divisible into 360 equal Parts call'd Degrees, each Degree containing 60 other Parts call'd Minutes: So the Theodolite is a round Instrument, representing the Horizon, and divided into 360 Degrees number'd at every tenth Degree, and each Degree subdivided into Halves and Quarters answering to 30 and 15 Minutes. It has two Diameters crossing each other at right Angles, whose Extremities represent the 4 Cardinals Points N. E. S. W. On the Center of these plays a moveable Diameter, whose Use is to give any intermediate Number of Degrees, with one of the fix'd Diameters, where the Quantity is less, or more than 90.

The Line, which represents North and South, passes thro' the Points of 180 and 360, and that Line (and, consequently, the Instrument) is rightly plac'd, when, by moving about the Instrument, the Needle in the Box plac'd in the Center, lies on the same Points.

To the fix'd Diameter, cutting into 180 and 360 Degrees, and to the moveable one (which for the Future we will call *The Index*) are

are fix'd perpendicular Sights for cutting Ob-
 Objects. The whole Instrument is sustain'd,
 as a plain Table is, and its Use follows in the
 Survey of Field A B C D, preceding.

Place the Instrument at Point E, the Index
 lying on the Diameter, cutting 180 and 360
 Degrees, and turn it about horizontally, 'til
 the Needle hang due North and South, and
 the two fix'd Diameters shall then answer the
 Lines N. S. and W. E.

Measure from Station E, to the four Angles,
 as has been taught, then direct the Sights of
 the Index to Point A, which will cut 6 Deg.
 30 Min. (reckon'd from the West Point of the
 central Line of the Diameter, representing, E.
 and W.) Point B will cut 69 Deg. reckon'd
 from the aforesaid Point; Point C will cut
 151 Deg. 30 Min. reckon'd from the same
 Point; but Point D will cut 95 Deg. which, be-
 ing in another Semicircle, you are therefore to
 reckon from the Point of East in the Instru-
 ment.

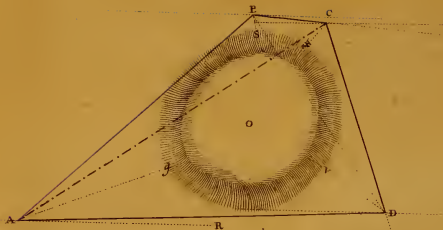
These Sides and Angles being thus found,
 your Field-Book will stand as follows.

<i>Angles</i>	D.	M.	C.	L.
A	6	30	3	—
B	69	—	2	14
C	151	30	2	51
D	95	—	1	90

From whence plot your Field, in this Manner. In any Part of your Paper draw a Line N S, for your North and South Line, or Meridian Line; cross it, at right Angles, in any Point, let it be at Point E, and draw the Line W E for your East and West Line; so shall those two Lines represent the two fix'd Diameters of the Instrument. On W E lay the Diameter of the Protractor, with its Center on E, (the Point of meeting of the two Lines N S and W E) Angle A being 6 Degrees. 30 Minutes; make a Dot in the Paper, against that Quantity, and from Point E, thro' that Dot, draw an occult Line E A at Pleasure, distance E A, being 3 Ch. set 3 Ch from E A; Angle B is 69 Deg. which prick off your Protractor, and draw the occult Line E B, which being 2 Ch. 14 Li. set that Quantity from E to B, and draw A B; Angle C being 151 Deg. 30 Min. prick it off, and draw E C, which being 2 Ch. 51 Li. set that Quant. from E to C, and draw B C; Ang. D is 95 Deg. which being in another Semicircle, place your Protractor on W. E. with the Semicircle downwards, and pricking off 95 Deg. draw the occult Line E D, which being 1 Ch. 90 Li. set it off from E to D, and draw A D.

This Survey imagines the Field to be a Level, but in Regard the Surveyor may be to seek when he meets with an hilly one, let A B C D be such a Feild, and therein the Hill O, FIG. VI.

Fig. VI.



Place the Instrument in any Angle thereof, A, and the Needle regarding North and South; let the Index cut a Mark at B, in 47 Deg. N. E. (reckon'd from the North Point in the Instrument.) Measure A B. 6 Ch. 35 Li. Measure also to the Foot of the Hill A g 3 Ch. 35 Li. cut a Man, or Mark, at g, in 70 Deg. N. E.

Your Instrument at B, the Index cuts C in 85 Deg. 30 Min. S. E. (from the South Point of the Instrument) measure B C 1 Ch. 50 Li. measure B s 65 Li. cut a Man at S, in 15 Deg. 30 Min. S E.

The Instrument at C, the Index cuts a Man at D, in 17 Deg. 30 Min. S. E. (from the South Point of the Instrument) measure CD 4 Ch. 10 Li. measure C w 85 Li. cut a Man at w, in 41 Deg. S. W.

Measure D A 7 Ch. 44 Li. measure D u 1 Ch. 72 Li. cut a Man at u, in 55 Degrees N. W.

From whence this is your Field-Book.

<i>Angles.</i>	D.M.	<i>Bearings</i>	<i>Sides.</i>	C. L.	<i>Offsets to the Hill.</i>	C. L.	D.M.	<i>Bearings.</i>				
A	47	—	NE	AB	6	35	A g	3	35	70	—	NE
B	85	30	SE	BC	1	50	B s	—	65	15	30	SE
C	17	30	SE	CD	4	10	C w	—	85	41	—	SW
D	—	—	—	DA	7	44	D u	1	72	55	—	NW

Protraction of this Work.

Draw an East and West Line, A R, at Pleasure; place the Diameter of the Protractor therein, and its Center on any Point therein A: prick off 47 Deg. (reckon'd from the Point of 90 Degrees in the Instrnment) N. E. and draw A B: set 6 Ch. 35 Li. from A to B.

Make an East, and West Line to run thro' B, place the Diameter thereon, and its Center in B: prick off 85 Degrees 30 Minutes (reckon'd from the Point of 90 Degrees, S. E.) and draw B C; set 1 Ch. 50 Li. from B to C.

Make an East and West Line to run thro' C, place the Diameter thereon, and its Center on C: prick off 17 Degrees 30 Minutes, (reckon'd from the Point of 90 Degres S. E.) and draw C D: set 4 Ch. 10 Li. from C to D.

Draw D A of Course, which will appear to be 7 Ch. 44 Li.

Thus have you the Shape of the Field, and, in Order to get that of the Hill, the Instrument being in Point A, the Bearing to g, the Foot of the Hill, was 70 Degrees N. E. which prick off, and draw A g; set 3 Ch. 35 Lines from A to g, the other Points, S w u, being found as easily by referring to the Field-book. I make the Foot of the Hill to run through g S w u, and shadow it, as in the Figure, to denote that it is an Hill.

To find the Contents of this Field, draw the Base-Line A C 7 Ch. 45, and Perpendiculars B w 95 Li. D w 3 Ch. 95 Li, and then the Work will stand as follows:

Base A C — 7 45 Perp. { 0 95 B w
 3 95 D w

372

490

372

980

3430

1470

Acre 1) 82280

4

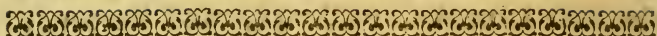
Roods 3)29120

40

Perches 11)64800

The aforesaid Method of finding the Shape of a Field, by going about the same, being of great Use, I advise the Surveyor to note it well.

To



To plot a Field, whose Largeness and Irregularity will not permit its being taken at one Station.

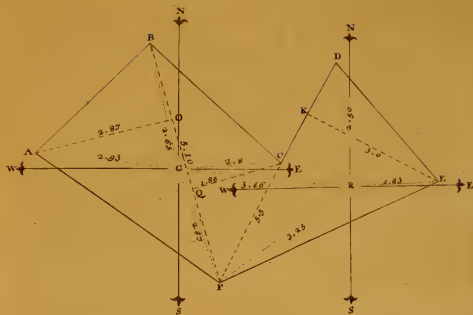
By the PLAIN TABLE.

FIG. 7. **L**ET the irregular Polygon A B C D E F be such a Field, and the first Station at Point G. Your Instrument being plac'd and prepar'd, as has been directed, direct your Index and Sights to A, and draw G A, measure G A 2 ch. 93 li. cut B, and draw G B, measure G B 2 ch. 65 li.; cut C, and draw G C, measure G C 2 ch. 8 li.; cut F, and draw G F, measure G F 2 ch. 47 li.; draw A B, B C, and F A.

At G direct your Sights and Index to any Point, or Person, standing in any Point, R, and draw G R, measure G R 3 ch. 46 li.

Point R is my second Station, where, placing my Instrument, I put the Index on the Line G R, and move it about, 'til I cut a Mark or Person standing at G, and there screwing it fast, 'tis prepar'd for taking the rest of the Field.

Direct your Index and Sights to D, and draw R D, measure R D 2 ch. 50 li.; cut Angle E, and draw R E, measure R E 1 ch. 83 li.; cut F, and draw R F, measure R F 3 ch.





25 li. Now draw CD, DE, EF, and the Shape of the Field appears.

This Figure is divisible into the Trapezium ABCF, by the Line CF, and the Residue into the Triangle FDE, by the same Line.

Draw the Base-Line BF, which on your Scale is 5 ch. 10 li. : draw the Perpendicular CQ, which is 1 ch. 85 li. : draw the Perpendicular AO, which is 2 ch. 87 li. ; set these several Distances on their proper Lines.

As for the Triangle FDE, its Base is always its longest Side FD, FD is on the Scales 5 ch. 5 li. ; from E draw the Perpendicular EK, which is 3 ch. ; set these Distances on their proper Lines. They who are curious to see the Entries of these Distances into the Field-Book, may take it as follows :

<i>Angles.</i>	<i>Measures.</i>	
1 st ☉ at G	C.	L.
A	2	93
B	2	65
C	2	8
F	2	47
2 ^d ☉ at R		
Stationary		
Distance.		
3 ch. 46 li.		
D	2	50
E	1	83
F	3	25

To find the Content of this Field.

As in Trapezia we multiply half the Base by the Sum of the two Perpendiculars, so in Triangles, F D E, we multiply the Base F D by the Perpendicular E K, and take half the Product for its superficial Content.

Here note, that, where a Field consists of two or more Trapezia, and Triangles, you must make a separate Work for each, and the Sum of those Operations will be the Content of the Field.

See the Work of the Field before us :

Trapezium-Base B F	5 10	<u> </u>	Perp.	{	2 87 AO	1 85 CQ
	$\frac{1}{2}$ 2 55	<u> </u>			4 72	
					2 55	
					<u> </u>	
					2360	
					2360	
					944	
					<u> </u>	
			Acre	1	20360	
					4	
					<u> </u>	
			Roods	0	81440	
					40	
					<u> </u>	
			Perches	32	57600	
					Triangle	

Triangle — Base F D 5 5 Perp. E K 3 0

3 0

Acres 1650

4

Roods 6600

40

Perches 2)64000

Acres. Roods. Perc.

Content of the { Trapezium — 1 0 32
Triangle — 0 0 2

Content of the whole Field }
A B C D E F ————— } 1 0 34

By the THEODOLITE.

Place the Instrument at first Station G, the Index on the Diameter cutting 180 and 360 Degrees, and the Needle on the Line of North and South; measure from Station G to Angles A B C F, as has been taught; then direct the Index to A, and it will cut 6 Deg. (reckon'd from the West Point of the Instrument) to B 77 Deg. to C 177 Deg. and to F 70 Deg. 30 Min. which being in another Semicircle, must be reckon'd from the Point of East in the Instrument. Thus much for the Trapezium, now for the Triangle.

The

The second Station being R, I also direct the Index to R, which cuts 6 Degrees, which, being in the lower Semicircle, must be reckon'd from the Point of East. The Instrument being at R, move the whole Instrument, (not the Index) 'til the Needle hang over the North and South Line, as before; direct the Index to D, and it will cut 86 Deg. to E 179 Deg. and to F 145 Deg. (which being in another Semicircle, must be reckon'd from the Point of East in the Instrument.)

From whence your Entries in the Field-Book will stand as follows :

<i>Angles.</i>	<i>D.</i>	<i>M.</i>	<i>C.</i>	<i>L.</i>
1st ☉ at G				
A	6	—	2	93
B	77	—	2	65
C	177	—	2	8
F	70	30	2	47
Stationary Declination —	6	—		
Stationary Distance---			3	46
D	86	—	2	50
E	179	—	1	83
F	145	—	3	25

From whence protract the Field in this Manner: In any Part of your Paper draw a Line N S, for your North and South Line,
or

or Meridian Line of the Trapezium; cross it at right Angles in any Point, let it be at Point G, and draw the Line W E for your East and West Line: On W E lay the Diameter of the Protractor, with its Center on G, Angle A being 6 Degrees, B 77 Degrees, C 177 Degrees; prick them off, and draw G A, G B, G C; but Angle F being in another Semicircle, place the Semicircle downwards on W E, prick off 70 Degrees 30 Minutes, and draw G F; at the same Time draw the stationary Declination 6 Degrees, and draw G R. On G A set off 2 ch. 93 li.; on G B 5 ch. 10 li. and draw A B; on G C 2 ch. 8 li. and draw B C; and on G F 2 ch. 47 li. and draw F A.

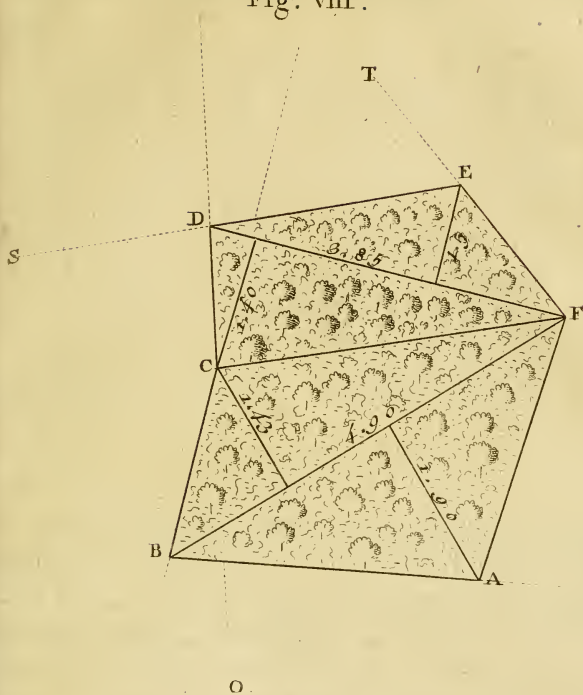
The stationary Distance being 3 ch. 46 li. set it from G to R, in which Point R drawing a new Meridian Line N.S, cross'd at right Angles in Point R, with the new East and West Line W E; on W E place your Protractor with the Center of its Diameter on R, Angle D being 86 Degrees, E 179 Degrees; prick them off, and draw R D, R E; Angle F being in another Semicircle, place the Semicircle downwards, and then prick off Angle F 145 Degrees, and draw off R F: On R D set off 2 ch. 50 li.; on R E 1 ch. 83 li. and draw D E, and on R F 3 ch. 25 li. and draw E F, which compleats the Field.

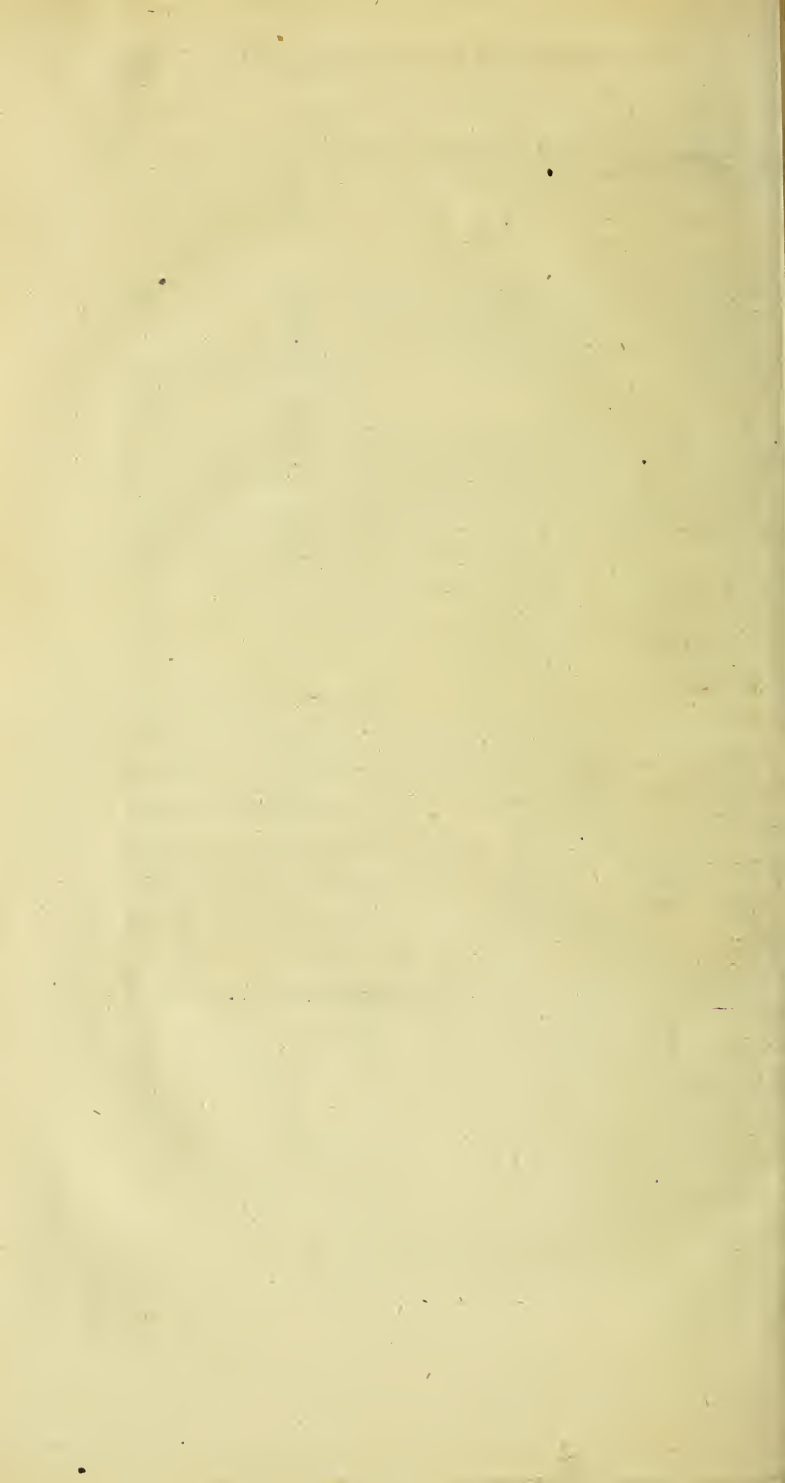
To measure a Wood, which, by Reason of the Thickness of Trees, can only be measur'd on the Out-side.

FIG. 8. **T**HE Truth of this Work depending wholly on the Exactness of Angles, I shall use the Theodolite only.

Let the irregular Polygon A B C D E F be such a Wood; place the Instrument at A, and turn it about, 'til thro' the fix'd Sights you espy Angle B, and then screw it fast. Direct the Index to F, the Index will then cut 104 Degrees; remove to B, measuring A B 3 ch. 25 li. At B let the fix'd Sights cut Angle C, and the Index Angle A 80 Degrees, so shall Angle B be 80 Degrees. Remove to C, measuring B C 2 ch. 5 li.; at C let the fix'd Sights cut Angle D, and the Index Angle B 200 Degrees, which exceeding a Semicircle, or 180 Degrees, is therefore an outward Angle, and must be noted thus $>$. Remove to D, measuring C D 1 ch. 44 li.; at D let the fix'd Sights cut Angle E, and the Index Angle C, 97 Degrees 30 Minutes, so shall Angle D be 97 Degrees 30 Minutes. Remove to E, measuring D E 2 ch. 65 li.; at E let the fix'd Sights cut Angle F, and the Index Angle D, 120 Degrees 30 Minutes, so shall Angle E be 120 Degrees 30 Minutes. Remove to F, measuring E F 1 ch. 75 li.; at F let the fix'd Sights cut Angle A, and the Index Angle E,

Fig. VIII.





124 Degrees, which is the Quantity of Angle F. Measure F A 3 ch.

From whence the Field-Book will stand thus:

<i>Angles.</i>	<i>D.</i>	<i>M.</i>	<i>Sides</i>	<i>C.</i>	<i>L.</i>
A	104	—	A B	3	25
B	80	—	B C	2	5
C	200	>	C D	1	44
D	97	30	D E	2	65
E	120	30	E F	1	75
F	124	—	F A	3	—

To protract this Work:

Draw a Line at Pleasure, as A B, on which apply the Diameter of your Protractor, with its Center on A, Angle A being 104 Degrees; (to be reckon'd from the left End of the Diameter, which, for the future, I shall call the North End, as the opposite End will be the South) prick off that Quantity, and draw A F, which, with A B, constitutes your Angle A; set 3 ch. 25 li. from A to B. Angle B being 80 Degrees, place the Center of the Diameter on B, and move the Instrument about, 'til A B cut 80 Degrees, to be reckon'd from the North End of the Diameter; prick off a Line by the Help of the Diameter, and draw B C. From B to C set 2 ch. 5 li. Angle C is

G 2

noted

noted to be an outward one, or more than 180 Degrees, *viz.* 200 Degrees; therefore, in order to protract it, apply the Center of the Diameter on C, and against 20 Degrees, (the Excess above a Semicircle) to be reckon'd from the South End, make a Mark; then bring the Diameter of the Instrument to that Mark, (its Center still on C) and at the North End prick a Mark, and draw C D; set 1 ch. 45 li. from C to D, so shall Angle C be 200 Degrees. Angle D is 97 Degrees 30 Minutes; place the Center of the Diameter on D, and move the Instrument about, 'til 97 Degrees 30 Minutes, reckon'd from the North End, cut C D, extended for this Purpose to O; at the said North End of the Diameter make a Mark, and draw D E, so shall Angle D be 97 Degrees 30 Minutes. Set 2 ch. 65 li. from D to E, Angle E is 120 Degrees 30 Minutes, the Center of the Diameter on E; move it about 'til 120 Degrees 30 Minutes (reckon'd from the North End) cut D E, extended for this Purpose to S. The Diameter will then cut A F in F, so shall A F become 124 Degrees, and E F 1 ch. 75 li. F A will be also 3 ch.

The

The Wood, thus protracted, is divisible into two Trapeziums, A B C F, and C D E F, by means of the Line. C F; and the Bases and Perpendiculars of each being drawn and measured, the Work will stand as follows.

Base B F	4 90	Perpend.	{ 1 43
	<u> </u>		{ 1 90
	$\frac{1}{2}$ 2 45		<u> </u>
			3 33
			2 45
			<u> </u>
			1665
			1332
			666
			<u> </u>
		Acres .)81585
			4
			<u> </u>
		Roods	3)26340
			40
			<u> </u>
		Perches	10)53600

G 3 Base

Base DF 3 85

 1 92

Perpend. { 1 40
 1 5

 2 90

 1 92

 580

 2610

 290

Acres .)55680

 4

Roods 2)22720

 40

Perches 9)08800

Acr. Roo. Perc.

1st Trapezium 0 3 10 $\frac{1}{10}$

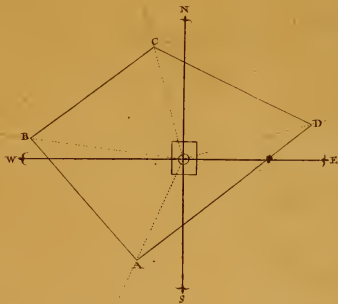
2d Trapezium 0 2 9

 Content of the Wood 1 1 19 $\frac{1}{10}$

*To take the Plot of a Field by the plain Table,
 by means of the Angles only.*

FIG. 9. **L**ET the Field, to be survey'd,
 be A B C D; place the jointed
 Frame, which is divided into 360 Degrees,
 with

Fig. IX.



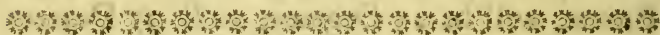


with that Face upwards, with the Point of 360 Degrees next you; the Center of those Divisions will therefore be the Hole in the Middle of the Instrument; In any Part of the Field, as at O, place the Instrument, and move it about, 'til the Needle lie on the North and South Line of the Chart, and then screw the Table fast, fixing a Pin in the aforefaid Hole; direct the Index and Sights thereby to A, and the Quantity cut on the Frame, will be 25 Degrees; to B 97 Degrees 30 Minutes, to C 165 Degrees 30 Minutes, and to D 254 Degrees 30 Minutes. Measure O A 2 ch. 25 li., O B 3 ch. 18 li., O C 2 ch. 40 li., and O D 2 ch. 70 li.; and then these will be your Field-Notes:

<i>Angles.</i>	<i>D.</i>	<i>M.</i>	<i>Lengths</i>	<i>C.</i>	<i>L</i>
A	25		⊙ A	2	25
B	97	30	⊙ B	3	18
C	165	30	⊙ C	2	40
D	254	30	⊙ D	2	70

From whence protract the Work thus: Draw the Lines W E and N S at right Angles; because the Line N S represents the Line passing thro' the Points of 360 and 180 Degrees in the Table, the Diameter of the Instrument must therefore be plac'd on S N, and its Center in O; and then prick off the Angles, A 25 Degrees, B 97 Degrees, C 165
G 4
Degrees

Degrees 30 Minutes: As for D, it being above a Semicircle, *viz.* 254 Degrees 30 Minutes, you must move the Semicircle round on O 'til the Diameter come again on N S: prick off 74 Degrees 30 Minutes, Supplement to 254 Degrees 30 Minutes, and draw $\odot A$, $\odot B$, $\odot C$, $\odot D$, on which Lines set off the Quantities noted in the Field-Book, and draw AB, BC, CD, and DA.



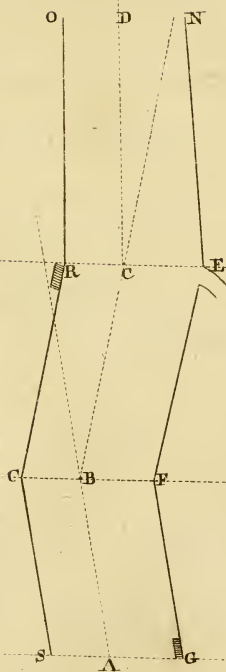
To survey a Road by the THEODOLITE:

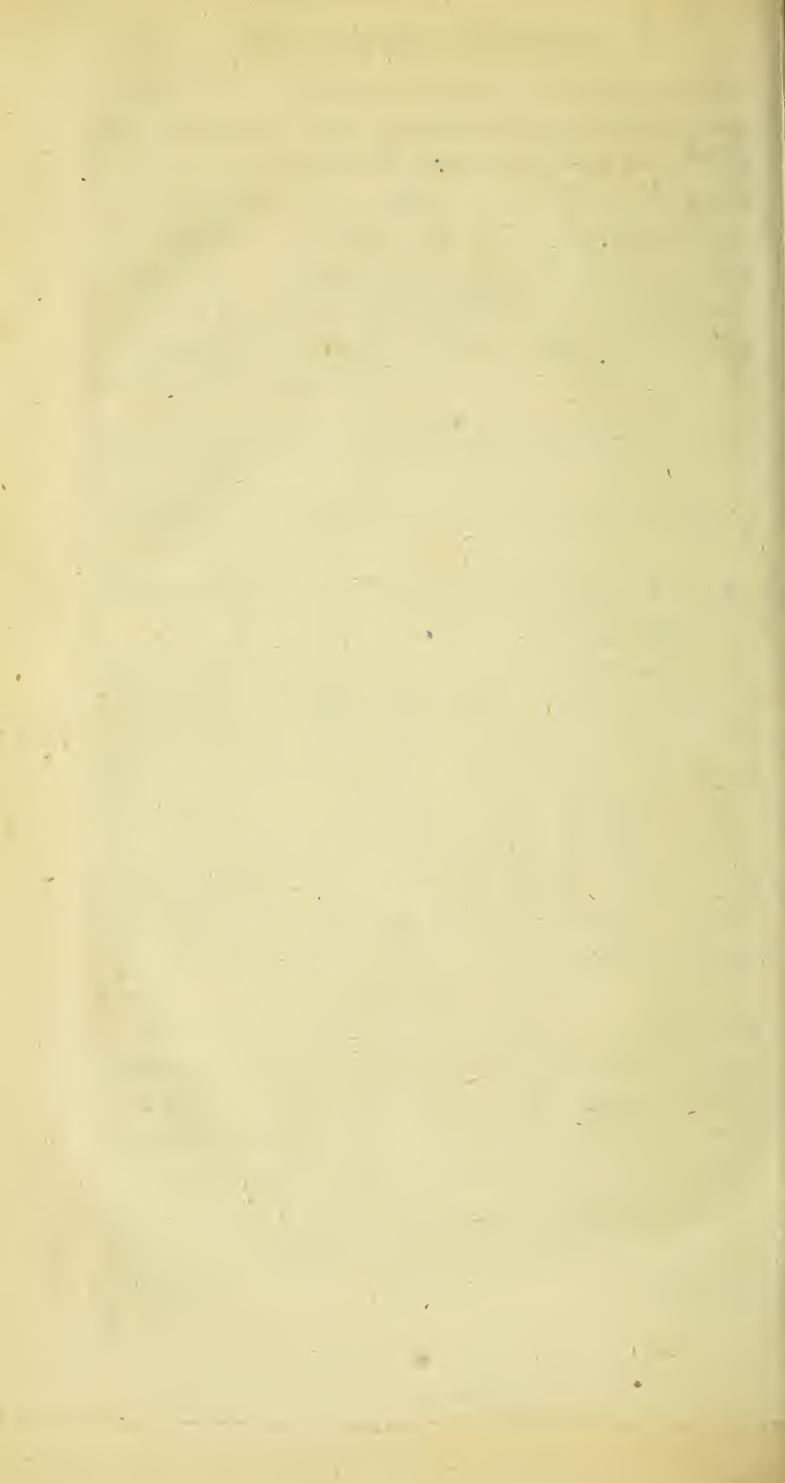
FIG. 10. **L**ET SCRO and NEFG be a Road to be survey'd: Begin at either End, suppose A, where place the Instrument, the Needle hanging over the Points of North and South in the Chart; let a Man go as far as you can see, or the next Bend of the Road, B, and direct your Index to cut him in 11 Degrees 30 Minutes, N W. Measure the Off-set to the Left, AS, 66 li., and the Off-set to the Right, AG, 75 li. Measure AB 1 ch. 90 li. an House to the Right at A.

Place the Instrument at B, in its former Position; let a Man go to C, another Bend; cut him with the Index in 10 Degrees, N E; measure BC (the stationary Distance) 2 ch. 32 li.; measure also the Off-set to the Left, BC, 58 li.; and to the Right, BF, 85 li.

Remove

Fig. X.





Remove to C, placing the Instrument as before: Let the Man remove to D; the End of the Road; cut him with the Index in 30 Degrees, N. W.; measure CD 2 ch. 55 li.; measure also the Off-set to the Left, CR, 58 li., and CE, Off-set to the Right, 85 li. at C, an House to the Left, and to the Right a Lane tending thus, N. At D measure the Off-sets D O 60 li., and DN 65 li., and draw RO and EN. From whence may arise this Table:

Angles and Observations.	Stationary Distances.	
	C.	L.
☉ A Off-set { left 66 li. right 75 li. An House to the Right.		
☉ B, N. W. 11 Deg. 30 Min. Off-set { left 58 li. right 85 li.	1	90
☉ C, N. E. 10 Degrees. Off-set { left 58 li. right 85 li.	2	32
An House to the Left, a Road to the Right N		
To the End D, 2 Deg. N. W.	2	55
Off-set { left 60 li. right 85 li.		

I reckon the Quantity of these Angles from the Point of North in the Instrument ; they who please, may reckon their Complements to 90° from the Points of East or West, and 'twill be the same Thing. If you would know the Length of this Road, add up the several stationary Distances, and their Sum is 5 ch. 77 li. ; which, from the following Table, appears to be 126 Yards, $\frac{2}{3}$ of a Yard, which is somewhat more than half a quarter of a Mile, as is also evident from the Table,

Stationary Distances		Sum of Distances
1	10	10
2	10	20
3	10	30
4	10	40
5	10	50
6	10	60
7	10	70
8	10	80
9	10	90
10	10	100
11	10	110
12	10	120
13	10	130
14	10	140
15	10	150
16	10	160
17	10	170
18	10	180
19	10	190
20	10	200
21	10	210
22	10	220
23	10	230
24	10	240
25	10	250
26	10	260
27	10	270
28	10	280
29	10	290
30	10	300
31	10	310
32	10	320
33	10	330
34	10	340
35	10	350
36	10	360
37	10	370
38	10	380
39	10	390
40	10	400
41	10	410
42	10	420
43	10	430
44	10	440
45	10	450
46	10	460
47	10	470
48	10	480
49	10	490
50	10	500
51	10	510
52	10	520
53	10	530
54	10	540
55	10	550
56	10	560
57	10	570
58	10	580
59	10	590
60	10	600
61	10	610
62	10	620
63	10	630
64	10	640
65	10	650
66	10	660
67	10	670
68	10	680
69	10	690
70	10	700
71	10	710
72	10	720
73	10	730
74	10	740
75	10	750
76	10	760
77	10	770
78	10	780
79	10	790
80	10	800
81	10	810
82	10	820
83	10	830
84	10	840
85	10	850
86	10	860
87	10	870
88	10	880
89	10	890
90	10	900
91	10	910
92	10	920
93	10	930
94	10	940
95	10	950
96	10	960
97	10	970
98	10	980
99	10	990
100	10	1000

A

A TABLE, reducing
Chains and Links into
Yards and Parts; and,
contrary, from $\frac{2}{100}$ of a
Yard to 2200 Yards, and
from 1 Link to 100 Ch.

<i>Yards.</i>	<i>Parts</i>	<i>Ch.</i>	<i>Li.</i>
	.22		1
	.45		2
	.68		3
1	.37		6 2
2	.75		12.5
5	.5		25
11			50
22		1	
44		2	
66		3	
88		4	
110		5	
220		10	
440		20	
660		30	
880		40	
1100		50	
1320		60	
1540		70	
1760		80	
1980		90	
2200		100	

The Use of the foregoing T A B L E.

What is the Length of 5 Chains 77 Links?

	<i>Yards.</i>
Against 5 Chains is ———	110
50 Links ———	11
25 Links ———	5 5
2 Links ———	0 45
	<hr/>
Sum	126 95

Contrary : In 126 Yards $\frac{9}{100}$, how many Chains and Links?

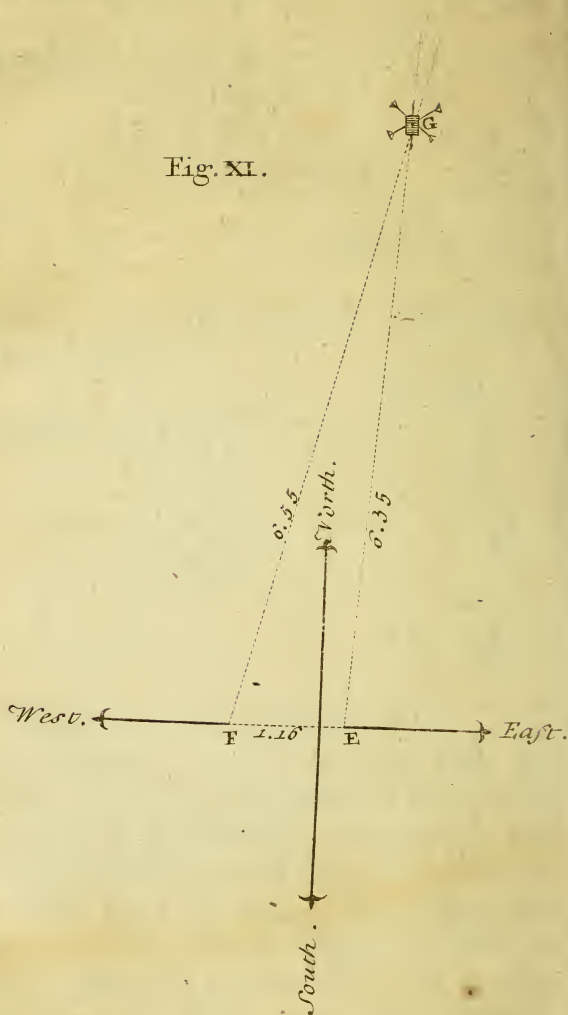
	<i>Ch.</i>	<i>Li.</i>
Against 110 Yards is ———	5	0
11 Yards ———	0	50
5 Yards ———	0	25
6 Parts ———	0	3
2 Parts ———	0	1
	<hr/>	
	5	79

To protract the aforesaid Road.


Thro' any Point, as A, draw an East and West Line, S A G, the Diameter lying with its Center on A and S A G, cutting 90 Degrees in the Limb or Semicircle; I say the Diameter shall then represent the North and South Line; and because Station B cuts 11 Degrees 30 Minutes North West, let the Semicircle lye to the West from the upper or North End of the Diameter, reckon 11 Deg. 30 Minutes, which prick off, and draw the occult



Fig. XI.



occult Line A B, of any Length, at Pleasure. Set 66 li. from A to S, and 75 li. from A to G; set also 1 ch. 90 li. from A to B; from B to Off-set C set 58 li., and to F 85 li.; draw S C and G F; at G draw an House.

Thro' B draw another East and West Line, C B F, whereon place the Instrument as before; but in regard the Angle at B, made by C, is 10 Degrees North East, let the Semi-circle lie to the East, and from the North End of the Diameter reckon 10 Degrees, which prick off, and draw the occult Line B C: Set 2 ch. 32 li. from B to C; set 58 li. from C to R, and 85 li. from C to E, and draw C R and F E; at R draw an House, and at E draw a Lane, tending thus, 

Thro' C draw an East and West Line, R C E, as before; and because Object D cuts 2 Degrees, N. W. place the Instrument as you did at A, and prick off 2 Degrees; draw C D, whereon set 2 ch. 55 li.; at D to O set 60 li. and to N 85 li., and draw R O and E N.

To take a Distance accessible or inaccessible.

FIG. II. FROM E or F, I would know the Distance to the Wind-mill at G.

Being at Point E, set up a Mark at Point F, measure E F 1 Ch. 16 Li. your Theodolite at E; bring the Needle to the North and South Points of the Chart, and screw the Instrument fast; direct the moveable Index to cut the Wind-mill in 94 Deg. reckon'd from the Point of West.

Remove

Remove any small Distance as to Point F, where bringing the Needle to the *North* and *South* Points, as before, screw the Instrument fast, and direct the moveable Index to cut the same Wind-mill in 75 Deg. reckon'd from the Point of *East*. Set 1 Ch. 16 Li. from E to F, and then you may find the occult Triangle E F G, and also either Distance F G, or E G, thus:

Draw a Line at Pleasure F E, for an *East* and *West* Line, assume therein the Point E for your first Place of Observation; and setting 1 Ch. 16 Li. from E to F Points, F is your second Place of Observation.

Place the Diameter of your Protractor on F E, with its Center on E; prick off 94 Deg. reckon'd from the *West*, or left End of the Diameter, and draw a Line at Pleasure E G.

The Diameter of the Instrument being still on E F, but its Center on F, prick off 75 Deg. reckon'd from the *East*, or right End of the Diameter, and draw F G; the Intersection of the two Lines E G and F G, gives Point G, the Place of standing of the Wind-mill.

The Distance of E G, taken from the Scale by which you set off E F, will appear to be 6 Ch. 35 Li. F G, taken from the same Scale, will be 6 Ch. 55 Li.

We by this Time suppose the Practitioner tolerably acquainted with the Methods of surveying, protracting, and adjusting the Contents of any single Field; and also of surveying,

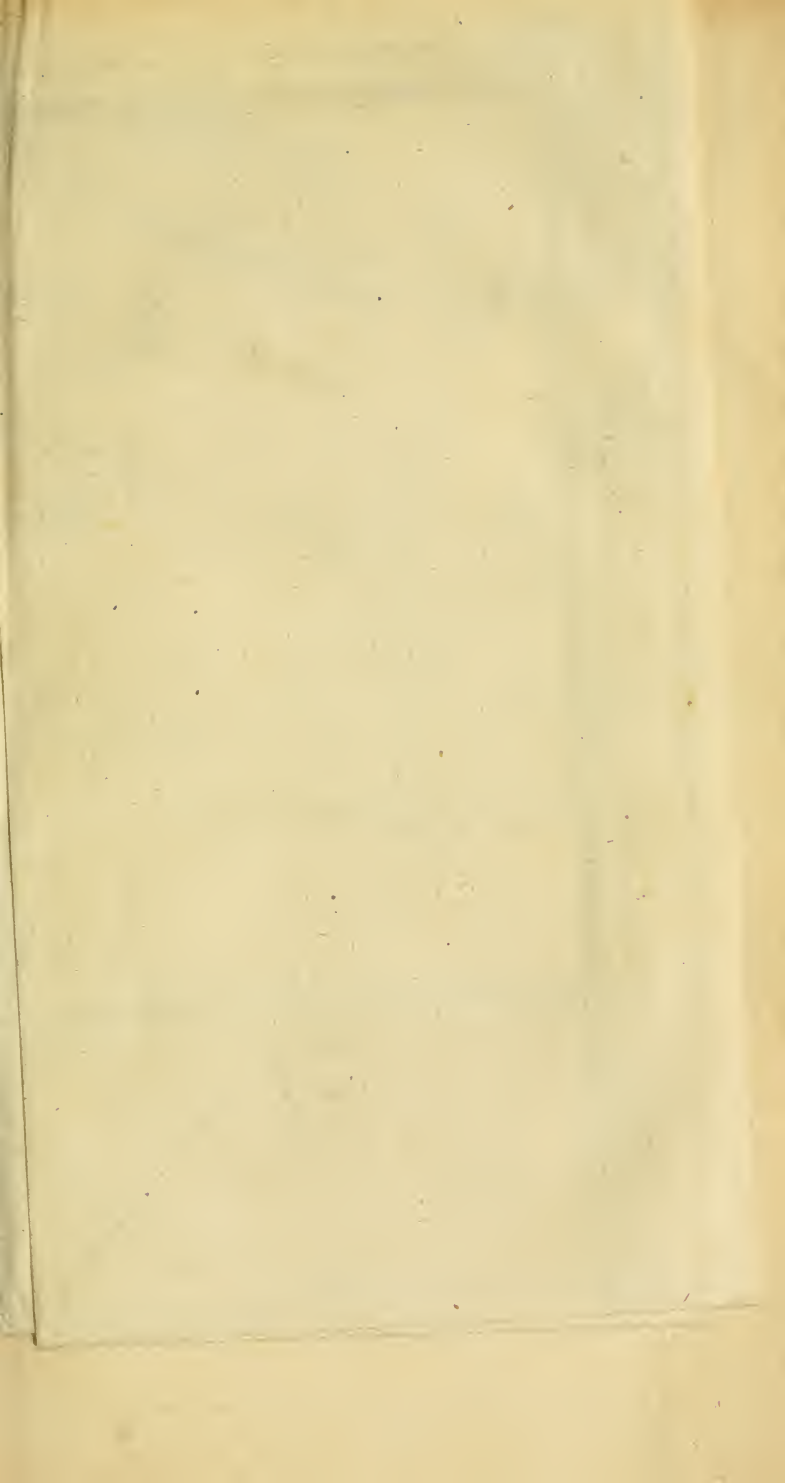
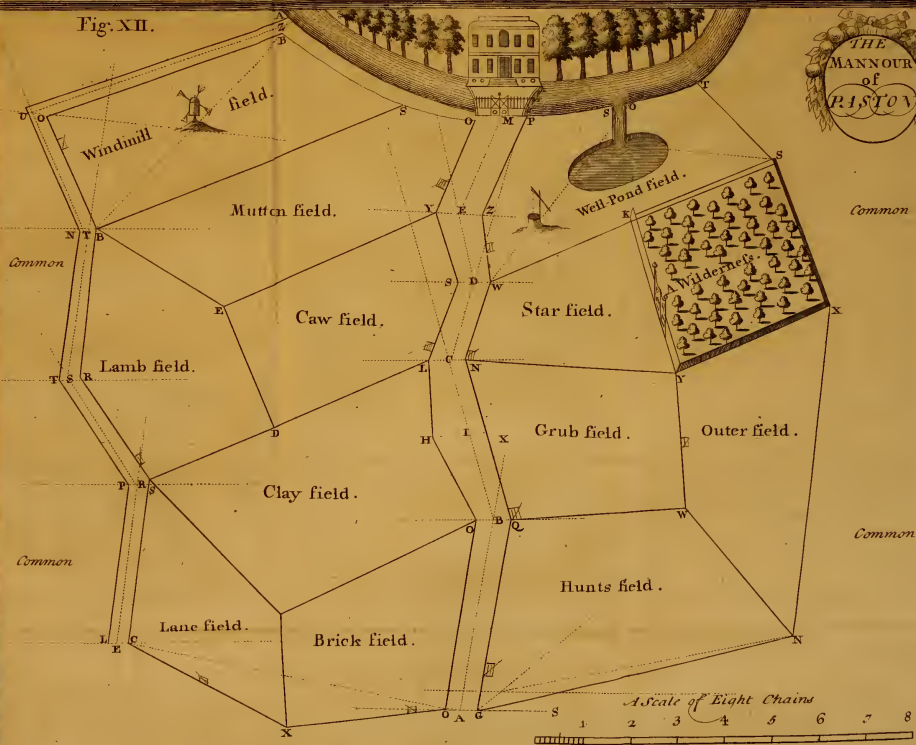


Fig. XII.



veying, protracting, and finding the Length of a Road; therefore we will conclude this Part, by letting him into the Method of taking and protracting a whole Mannour.

Walk over the Mannour two or three times, the better to know where to begin, and how to proceed in your Works to the best Advantage; at which Time you may take such Notes and Memorandums, as you think proper, of all Roads, Lanes, Butting-hedges, Waters, Houses, &c. The Truth of this Survey depending on the exact taking of Angles, and it consisting of so many Parts as we imagine cannot be taken in the Fields, on one Piece of Paper, our Instrument shall be the *Theodolite*.

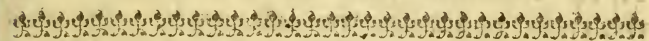


FIG. 12. **F**ixing the *Theodolite* at A, and the Needle hanging over the Meridian Line, let a Man stand at the first Bend of the Road B, direct your Index to him, and it will cut 9 Degrees N. E. which note down in your Field-Book, with this Mark © A 9 Degrees N. E.; measure the Off-sets to the right A G 32 li., left A O 35 li., and note them in your Book. Measure A B 4 ch. 5 li. The Instrument fix'd at B, as before it was at A, with the Index cut a Man at the next Bend C 15 Degrees, Off-sets to the left, B O, 35 li.; to the right, B Q. 35 li. a butting Hedge on

on each Side, B. Measure B C 3 ch. 45 li. at 1 ch. 89 li. from B, *viz.* at I, a Bend to the left, 84 li., to the right 46 li.; at C Off-sets to the left 45 li., to the right 32 li., a But-Hedge to the right and left.

The Instrument fix'd at C, let the Index cut a Man at D, in 15 Degrees 30 Minutes N. E. Measure C D 1 ch. 72 li., at D Off-sets to the left 35 li., to the right 35 li.; at D a But-Hedge to the right.

The Instrument fix'd at D, let the Index cut a Man at E, in 13 Degrees N. W. Measure D E 1 ch. 46 li.; at E Off-sets to the right 45 li., to the left 47 li.; at E a But-Hedge to the left.

The Instrument fix'd at E, cut the Center of the Gate at M in 18 Degrees 30 Minutes N. E. Measure E M 2 ch. 18 li., Off-sets to the right 50 li., to the left 45 li. By this Means one or more Sides of each Field, on each Side the Road, will, on Protraction, appear to be given; which shortening the Work, I shall not enter the Fields themselves, 'til the Lane to the left of the Road be survey'd. In order whereto, at A, your first Station, placing your Instrument as you did originally, let some high Object be plac'd at E, the Enterance of the Lane, which cutting with your Index in 78 Degrees N. W. measure A E (if you can) 7 ch. 34 li.; because on Protraction, the Point E will be thereby found.

The

The Instrument fix'd at E, the Index cuts R in 7 Degrees N. E; Offsets to the right 23 li., to the left 14 li. E R is 3 ch. 35. li.; at R the Index cuts S in 31 Degrees 30 Minutes N. W; Offsets to the left 15 li., to the right 20 li. At R a But-Hedge to the right, R S 2 ch. 60 li.

At S the Index cuts T in 7 Degrees N. E.; Offsets to the right and left 20 li. each; S T 3 ch. 55 li..

At T the Index cuts O in 7 Deg. N. W. Offsets to the right and left 20 li. each; T O 2 ch. 70 li.; at T two But-Hedges meeting in a Point to the right.

At O, where the Off-set left is 23 li., the Index cuts Z in 70 Degrees N. E; O Z is 5 ch. 63 li. At Z the Offsets, right and left, are 12 li. each.

In surveying up O Z, I observ'd a Windmill in *Windmill field*, to find the Point whereon it stands, at Z I place my Instrument, with the Needle on the North and South Line, as before, and the Sights will cut it in 49 Degrees S. W. (reckon'd from the Point of West) At O the Index cuts the same Windmill, in 6 Degrees S. E. reckon'd from the Point of East.

By surveying this Lane, we have one or more Sides of each Field on one Side of it given.

We now enter the Fields themselves, beginning with

Hunt's Field.

In measuring the Road-Side G Q was given. To find a Station for your Instrument, work

H

thus:

thus: Measure 50 li. from G to W; let two Men stand, one at G, the other at W, each holding an End of the Chain; let the Surveyour take the Middle of the Chain, and stretch it out strait to r (thus w r is 40 li., and G r 60 li.); at r place the Instrument, the Index on the Diameter; turn the whole Instrument about, 'til thro' the Sights you cut Angle G, (so is the Instrument fix'd) then direct the Index to Angle N, and the Degrees cut shall be 29, 30 (reckon'd from the North End of the Diameter); measure r N 6 ch. 20 li.; measure N G 6 ch. 75 li.; measure N W (a Side also of *Outer-field*) 3 ch. 53 li.; measure W Q (also a Side of *Grub-field*) 3 ch. 65 li.; G Q the same as A B, which is already noted to be 4 ch. 5 li.

Outer-field. Side W N is given, measure N X 6 ch. 92 li., X Y 3 ch. 47 li., Y W 2 ch. 80 li.

Grub-field. Sides Q N, Q W, and W Y, given, measure N Y 4 ch. 40 li.

Star-field. Sides N W and N Y given, measure Y K 3 ch. 32 li. (of which from Y to the Center of the Wood-door, 1 ch. 66 li.) and W K 3 ch. 16 li.

Well-pond-field. Where, in measuring *Star-field*, we had Part of Side W S given, viz. W K 3 ch. 16 li.; measure the Remainder K S 3 ch. 24 li.; therefore W S is 6 ch. 40 li. K S bounds the Wood. Measure S T 2 ch. 30 li. T O bounds the River; at O come to a small Cut into the Pond; measure T O 1 ch. 60 li.

S is the other Side of the Cut ; measure S P 1 ch. 80 li. ; at P come to the Gate and Road ; therefore P Z and Z W (equal to E M and E D) are already given. On a Line W O stands a Well, 1 ch. 35 li. from W ; from the Well to the Brink of the Pond 1 ch. 10 li. ; from K (in Side W S) to the Pond 70 li. ; from Angle S to the Pond 2 ch. 15 li. ; Length of the Cut into the Pond, 65 li. Breadth 17 li.

The Wilderness. S K, K Y, and Y X, given, measure S X 3 ch. 20 li.

Fields on the left Side of the Road.

Had not Point E of the Lane been found, when we were at Point A of the Road, we must, on entering *Brick-field*, have proceeded to find a Station for the Instrument, as we did at r in *Hunt's-field*.

Brick field. Side O Q given ; measure O X 3 ch. 40 li. ; measure X T 2 ch. 45 li. ; measure T O 4 ch. 60 li.

Lane-field. Side T X given, measure X C 3 ch. 65 li. C S is given, (being equal to E R) measure S T.

Clay-field. Sides, S T, T O, O H, H L, given, measure L S, from L to D a But-Hedge, 3 ch. 50 li., and from D to S 2 ch. 82 li. ; therefore L S 6 ch. 32 li.

Here we shall observe, that tho' the Sides, O H, H L, are more than B C, and therefore should be measur'd, yet, being enabled by the Off-set I H to give the Point H, I can draw

H 2

H L

L H and **O** H, and 'tis done; but they who please may, for more Certainty, measure those two Sides, and set them down amongst the rest.

Lamb-field. Sides, **S** D, **S** R, **R** B, given, measure **B** E 3 ch. 23 li., and **E** D 2 ch. 73 li.

Cow-field. Sides, **Y** S, **S** L, **L** D, and **D** E, given, measure **E** Y 4 ch. 85 li.

Mutton-field. Sides given, **B** E, **E** Y, **Y** O, measure **O** S 1 ch. 55 li. and **S** B 6 ch. 93 li. **O** S bends somewhat, and bounds the Lane or Passage; Breadth of the Lane, or Passage 25 li.

Windmill-field. Sides **Z** O, **O** B, and **B** S, measure **Z** S 2 ch. 92 li. In this Field a Windmill, of which more on Protraction. **Z** S a little bending. Breadth of the River 63 li.; over it a boarded Bridge to the Mansion-House; Breadth of the Mansion-House 1 ch. 40 li. Trees planted close to the River, and on each Side of the House.

From all which Work your Field-Book may stand as follows.

STATIONS and REMARKS.

D.M.

C. L.

Road to the House.

1st. ☉ A, N. E. —————	9		
Off-set { to the right 32 li. { to the left 35 li.			
A B —————		4	5
2d. ☉ B, N. W. —————	15		
Off-set { to the left 35 li. { to the right 35 li.			
At 1 ch. 89 li. from B. Off-set to the left 84 li. to the right 46 li.			
B C —————		3	45
3d. ☉ C, N. E. —————	15 30		
Off-set { to the left 45 li. { to the right 32 li.			
C D —————		1	72
4th. ☉ D, N. W. —————	13		
Off-set { to the left 35 li. { to the right 35 li.			
D E —————		1	46
5th. ☉ E, N. E. —————	18 30		
Off-set { to the right 45 li. { to the left 47 li.			
E M comes to the Gate of the House —————		2	18
Off set { to the right 50 li. { to the left 45 li.			
A small winding Lane to the left at M. H 3			

STATIONS and REMARKS.	D. M.	C. L.
<i>Lane.</i>		
At \odot A (of the Road) cut Entrance of the Lane, N. W. ———	78	
A E, Distance between the two Entries of the Road and Lane		7 34
1st \odot E, N. E. ———	7	
Off-set $\left\{ \begin{array}{l} \text{to the right} \quad 23 \text{ li.} \\ \text{to the left} \quad 14 \text{ li.} \end{array} \right.$		
E R ———		3 35
2d. \odot R, N. W. ———	31 30	
Off-set right and left 15 li. each		
R S ———		2 60
3d. \odot S, N. E. ———	7	
Off-set right and left 20 li. each.		
S T ———		3 15
4th. \odot T, N. W. ———	7	
Off-set right and left 20 li. each		
T O ———		2 70
5th. \odot O, N. E. ———	70	
Off-set $\left\{ \begin{array}{l} \text{left} \quad 16 \text{ li.} \\ \text{right} \quad 21 \text{ li.} \end{array} \right.$		
O Z ———		5 62
At Z Off-set right and left 12 li.		
Turn down to the House by the River.		
At O a Windmill in <i>Windmill-field</i> bore S. E. 6 Degrees.		

STATIONS and REMARKS. D. M. C. L.

At Z the same Windmill bore S.
W. 42 Degrees.

Fields on the right Side of the Road.

Hunt's Field.

Belonging { G w — 50 li. on G Q
to the { w r — 40
Station { G r — 60

○ at r —————	29	30		
r N —————			6	20
N G —————			6	75
N W, bounding <i>Outer-field</i> ———			3	53
W Q, bounding <i>Grub-field</i> ———			3	65
G Q, bounding the Road ———			4	5

Outer-field.

W N, bounding <i>Hunt's Field</i> ———			3	53
N X, bounding a Common ———			6	92
X Y, bounding the <i>Wilderness</i> ———			3	47
Y W, bounding <i>Grub-field</i> ———			2	80

Grub-field.

W Y, bounding <i>Outer-field</i> ———			2	80
Q W, bounding <i>Hunt's Field</i> ———			3	65

H 4

Q N,

STATIONS and REMARKS.	D. M.	C. L.
Q N, bounding the Road to the House —————	3	45
N Y, bounding <i>Star-field</i> —————	4	40
<i>Star-field.</i>		
N Y, bounding <i>Grub field</i> —————	4	40
From Y to the Gate of the <i>Wilderness</i> , 1 ch. 66 li.		
Y K, bounding the <i>Wilderness</i> —————	3	32
W K, bounding <i>Well-pond-field</i> —————	3	16
W N, bounding the Road —————	1	72
<i>Well-pond-field.</i>		
W K, bounding <i>Star-field</i> , 3 ch. 16 li. K S, bounding the Wood 3 ch. 24 li. therefore W S —————	6	40
S T, bounding the Common —————	2	30
From T to O, the Cut of the River into the Pond —————	1	60
From S, the other Side of the said Cut, to Angle P, to wit, S P (at P, the Gate of the House.) —————	1	80
P Z, bounding the Road —————	2	18
Z W, also bounding the Road —————	1	46
Breadth of the Cut —————		17
Length of the Cut —————		65
	From	

STATIONS and REMARKS.	D.M.	C.L.
From W on a Line, to O the Cut, a Well at —————	—	1 35
From S to the Oval Pond —————	—	2 15
From W to the Pond —————	—	2 70

The Wilderness.

Y Z, bounding Outer-field —————	—	3 47
K Y, bounding Star-field —————	—	3 32
i ch. 66 li. from Y to the Gate.		
K S, bounding Pond-field —————	—	3 24
S X, bounding the Common —————	—	3 20

*Fields on the left Side of the Road,
between it and the Lane.*

Brick-field.

O O, bounding the Road —————	—	4 5
O X, bounding the Common —————	—	3 40
X T, bounding Lane-field —————	—	2 45
T O, bounding Clay-field —————	—	4 60

Lane-field.

X C, bounding the Common —————	—	3 65
C S, bounding the Lane —————	—	3 35

S T,

STATIONS and REMARKS.	D. M.	C. L.
S T, bounding <i>Clay-field</i> ———	—	3 93
X T, bounding <i>Brick-field</i> ———	—	2 45
<i>Clay-field.</i>		
T O, bounding <i>Brick-field</i> ———	—	4 60
S T, bounding the Lane ———	—	3 93
S L, bounding <i>Lamb</i> and <i>Cow-</i> <i>fields</i> , 6 ch. 32 li. (a But-Hedge at 3 ch. 50 li. from S to D.)	—	6 32
Angle at S runs up to the Lane:		
<i>Lamb-field.</i>		
S D, bounding Part of <i>Clay-field</i> ---	—	3 50
R S, bounding the Lane ———	—	2 60
R B, bounding the Lane ———	—	3 15
B E, bounding <i>Mutton-field</i> ———	—	3 23
A But-Hedge at Angle E		
E D, bounding <i>Cow-field</i> ———	—	2 73
<i>Cow-field.</i>		
E D, bounding <i>Lamb-field</i> ———	—	2 73
D L (Remainder of S L, 6 ch 32 li.) viz. S D is 3 ch. 50 li. therefore D L is ———	—	2 82
L S, bounding the Road ———	—	1 72

SY

STATIONS and REMARKS.	D. M.		D. L.	
S Y ditto —————	—	—	1	46
Y E, bounding <i>Mutton-field</i> ———	—	—	4	85
<i>Mutton-field.</i>				
B E, bounding <i>Lamb-field</i> , and running up to the Lane ———	—	—	3	23
E Y, bounding <i>Cow-field</i> ———	—	—	4	85
Y O, bounding the Road ———	—	—	2	18
O S, a small Bend, bounding the Passage coming in at the upper End of the Road ———	—	—	1	55
Breadth of the said Passage ———	—	—		25
B S, bounding <i>Windmill-field</i> ———	—	—	6	93
<i>Windmill-field.</i>				
S B, bounding <i>Mutton-field</i> ———	—	—	6	93
It runs up to the lane.				
B O, bounding the Lane ———	—	—	2	70
O Z, bounding the Lane, and running up the Path by the River ———	—	—	5	63
O Z bends somewhat ———	—	—		
Z S, Part of the Path running by the River ———	—	—	2	92
A Windmill in the Field, whose Bearing was taken in measuring the Lane O Z, which <i>vide</i> .				

Along

STATIONS and REMARKS.	D. M.	C. L.
Along the Path to the House, Z S and S O, a River 63 li. broad: Over it a boarded Bridge, ad- joining to the Mansion-House. Trees planted close to the other Side of the River, on each Side the House.		
Breadth of the House ————	—	I 40

The practical Surveyor will, perhaps, think these Notes much too bulky ; but a Beginner may want them, and he is at Liberty to shorten them, as he increases his Knowledge.

To protract the Work of this Mannour.

In this, as in the former Work, I make the Point of 90 Degrees to pass thro' the East and West Line in my Paper ; and therefore the Diameter becomes the North and South Line, from which Diameter I reckon the Degrees and Minutes of any Angle.

Your Field-Book being before you, on a Sheet of Paper draw a right Line, in any convenient Place thereof, as O A S ; for an East and West Line, assume Point A therein for your first Station ; whereon placing the Protractor, as aforesaid, prick off 9 Degrees, N. E. and draw A B, of any Length ; set 4 ch. 5 li. from A to B. Thro'

Thro' B, the second Station, draw an East and West Line; whereon placing the Instrument, prick off 15 Degrees, *N. W.* and draw B C; set 3 ch. 45 li. from B to C.

Thro' C, the third Station, draw an East and West Line; whereon placing the Instrument, prick off 15 Degrees 30 Minutes, *N. E.* and draw C D; set 1 ch. 72 li. from C to D.

Thro' D, the fourth Station, draw an East and West Line; place the Instrument, and prick off 13 Degrees, *N. W.* and draw D E; set 1 ch. 46 li. from D to E.

Thro' E, the fifth Station, draw an East and West Line; place the Instrument, and prick off 18 Degrees 30 Minutes, *N. E.* and draw E M; set 2 ch. 18 li. from E to M, where I am come to the Gate.

Off-sets in this Road.

First Station, A, Off-set to the right 32 li. to the left 35 li., which set from A, on each Side, accordingly.

Second Station, B, Off-set to the left 35 li., to the right 35 li.; draw O O and G Q.

Between the second and third Stations, at 1 ch. 89 li. from B Off-set to the left 84 li., to the right 46 li.; draw O H and Q X.

Third Station, C, Off-set to the left 45 li., to the right 32 li.; draw H L and X N.

Fourth Station, D, Off-set to the left 35 li., to the right 35 li.; draw L S and N W.

Fifth

Fifth Station, E, Off-set to the right 45 li., to the left 47 li.; draw S Y and W Z.

At M, the Gate, Off-set to the right 50 li., to the left 45 li.; draw Y O and Z P.

We would now have begun with the Fields, but as the Lane stands next in Order in the Field-Notes, we will first dispatch that.

At Point A with the Index cut Point E, in the Road, 78 Degrees; fix the Center of the Protractor on A, and its Diameter to represent North and South; and then prick off 78 Degrees, and draw A E; set 7 ch. 34 li. from A to E.

Point E being found, it is my first Station.

Thro' E draw an East and West Line; whereon placing the Protractor, prick off 7 Degrees, *N. E.* and draw E R; set 3 ch. 35 li. from E to R.

Thro' R draw an East and West Line; place the Protractor, and prick off 31 Degrees 30 Minutes, *N. W.* and draw R S; set 2 ch. 60 li. from R to S.

Thro' S draw an East and West Line; place the Protractor, and prick off 7 Degrees, *N. E.* and draw S T; set 3 ch. 15 li. from S to T.

Thro' T draw an East and West Line; place the Protractor, and prick off 7 Degrees, *N. W.* and draw T O; set 2 ch. 70 li. from T to O.

Thro' O draw an East and West Line; place the Protractor, and prick off 70 Degrees,

grees, *N. E.*; draw O Z, and set 5 ch. 63 li. from O to Z.

Off-sets in the Lane.

First Station, E, Off-set to the right 23 li., which set from E to C; to the left 14 li., which set from E to L.

Second Station, R, Off-sets to the right and left 15 li. each; draw L P and C S. Two But-Hedges to the right.

Third Station, S, Off-sets to the right and left 20 li. each; draw P T and S R.

Fourth Station, T, Off-sets to the right and left 20 li. each; draw T N and R B. Two But-Hedges to the right.

Fifth Station, O, Off-set to the left 16 li., to the right 21 li.; draw N U and B O.

At Z Off-sets to the right and left 12 li.; draw U A and O B.

In measuring O Z, I observ'd a Windmill in *Windmill-field*, which, now I am about that Part, I will place down, tho' the Field be not fully drawn.

At O I observ'd, by my Theodolite, that it bore *S. E.* 6 Degrees; wherefore place the Protractor at O, as you did before, and set off 96 Degrees, which is 6 Degrees, *S. E.* from the Point of East, and draw O X.

At Z I make the same Observation, and finding the Windmill bears 42 Degrees, *S. W.* place the Protractor, and prick off 42 Degrees, and draw Z X. The Intersection of these two
Lines

Lines gives the Point of the Windmill, X ; draw the Windmill according to its Shape.

Fields to the right of the Road.

Hunt's-field. Herein your Station was found at r, thus: G Q is already drawn; set 50 li. from G to W ; on W strike an Arch, with the Distance of 40 li., and on G intersect it with 60 li.: Then draw G r, which becoming the Line whereon you lay the Diameter of the Protractor, with its Center on r, and pricking off 29 Degrees 30 Minutes ; (the Quantity of Angle N, taken at r) draw the occult Line r N ; set 6 ch. 20 li. from r to N ; and then draw G N, which is 6 ch. 75 li. N. W. being 3 ch. 53 li.: Take 3 ch. 53 li. from your Scale in your Compasses, and on N strike an Arch towards W, QW being 3 ch. 65 li.; take that Distance from your Scale, and on Q intersect your former Arch, which will give Point W ; draw N W and W Q. In the Field-Book I have set down, a second time, all the Sides of each Field, which were before given, on protracting any other Field, for the Surveyor's more sure Guide in the Prosecution of his Work ; but he may omit it if he pleases.

Outer-field. This Field cannot be protracted, (as it will appear on Tryal) 'til we have dispatch'd *Grub-field* ; therefore go to

Grub-field. Sides Q N, and Q W, are protracted. On N sweep 4 ch. 40 li. towards Y ;
on

on W sweep 2 ch. 80 li. towards Y; to the Intersection at Y draw N Y and W Y.

Outer field. Sides Y W and W N given. On N sweep 6 ch. 92 li. towards X; on Y sweep 3 ch. 47 li. towards X; to the Intersection at X draw Y X and N X.

Star-field. Sides N Y and N W are protracted. On W sweep 3 ch. 16 li.; towards K and on Y sweep 3 ch. 32 li. towards K: To the Intersection at K draw W K and Y K. Y K bounding the *Wilderness*, take 1 ch. 66 li., and set it from Y to the Point of the Gate of the said *Wilderness*.

The Wilderness. Sides W X and K Y are protracted. On K, towards S, strike an Arch with 3 ch. 24 li.; towards S; and on X strike an Arch with 3 ch. 20 li. towards S; to the Intersection at S draw K S and X S.

Well-pond-field. Sides S W, W Z, and Z P, are protracted. On S, towards T, strike an Arch, with the Distance of 2 ch. 30 li.; P S is 1 ch. 80 li.; Breadth of the Cut 17 li., and T O 1 ch. 60 li.; therefore P T is 3 ch. 57 li. On P, towards T, strike an Arch with 3 ch. 57 li., and draw S T; set 1 ch. 60 li. from T to O, and 17 li. from O to S, and 65 li. for its Length, and draw the Cut. Measure 2 ch. 15 li. from Angle S, (next the *Wilderness*) and 2 ch. 70 li. from Angle W, in a Line, towards O, which will give you the two Ends of the Pond. From W to the Well 1 ch. 35 li.

Fields to the left of the Road, between it and the Lane.

Brick-field. Sides O O. On O, towards X, sweep 3 ch. 40 li. On C (in *Lane-field*) sweep 3 ch. 65 li. towards X; to the Intersection draw OX in *Brick-field*, and CX in *Lane-field*. On O, towards T, sweep 4 ch. 60 li., and on X, towards T, 2 ch. 45 li.; to the Intersection at T draw OT and XT.

Lane field. Sides TX, XC, and CS, are given. On S, towards T, strike 3 ch. 93 li. or (which is the same Thing) draw ST.

Clay-field. Sides ST, TO, OH, HL, given. Draw SDL. A But-Hedge to D, at 3 ch. 50 li. from S.

Lamb field. Sides SD, SR, RB, given. On B sweep 3 ch. 23 li. towards E; on D sweep 2 ch. 73 li. towards E; to the Intersection at E draw BE and DE.

Cow-field. Sides ED, DL, LS, and SY, given. Draw EY, which will be found to be 4 ch. 85 li.

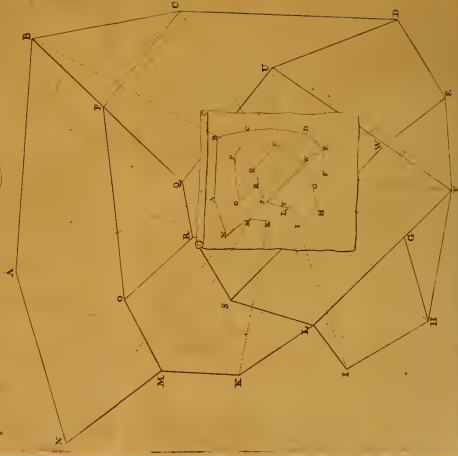
Mutton-field. Sides BE, EY, and YO, given. OS is a small Bend; on O sweep 1 ch. 55 li. towards S, and on B sweep 6 ch. 93 li. towards S; to the Intersection at S draw OS somewhat bending, and BS.

Windmill-field. The Point of the Windmill has been already given, and so have Sides ZO, OB, and BS. On B sweep 6 ch. 93 li. towards S; or (which is the same Thing) draw

BS

Fig. 13.

Of the Contraction or Enlargement of Maps.



B S 6 ch. 93 li. a little bending, to answer S O.

The Field Book implies the Grounds, which fetch in this Mannour, to be a Common; wherefore the Word *Common* may be written in convenient Places accordingly.

He who would give the Contents of this Mannour in Acres, may reduce the several Fields, the Road, and Lane, into Trapezia and Triangles, and work according to the Method I have before plainly laid down; and the Answers of all the Operations, added together, shall be his grand Answer.

You may, if you please, insert, as I have done, the Scale by which you measur'd, together with the Name of the Mannour, in a fair Compartment: It may also, for more Beauty, be adorn'd with transparent Water-Colours, painting all Trees and Hedges of a pretty deep green, Fields of a pale green, Waters blue, Roads, &c. yellow; insert also each Field's Name.

A Mannour, so drawn, may be drawn in a bigger or less Compass, by squaring your Draught, and making your new Paper of the same Number of Squares, and then by putting all into one Square, which you see in the Square corresponding with it; your new Draft shall be exact in all Particulars.

This has been the usual Method of contracting or enlarging any Map or Plott of a Field, or Estate; but the quickest, and, I think, the easiest Method, is as follows; which, for

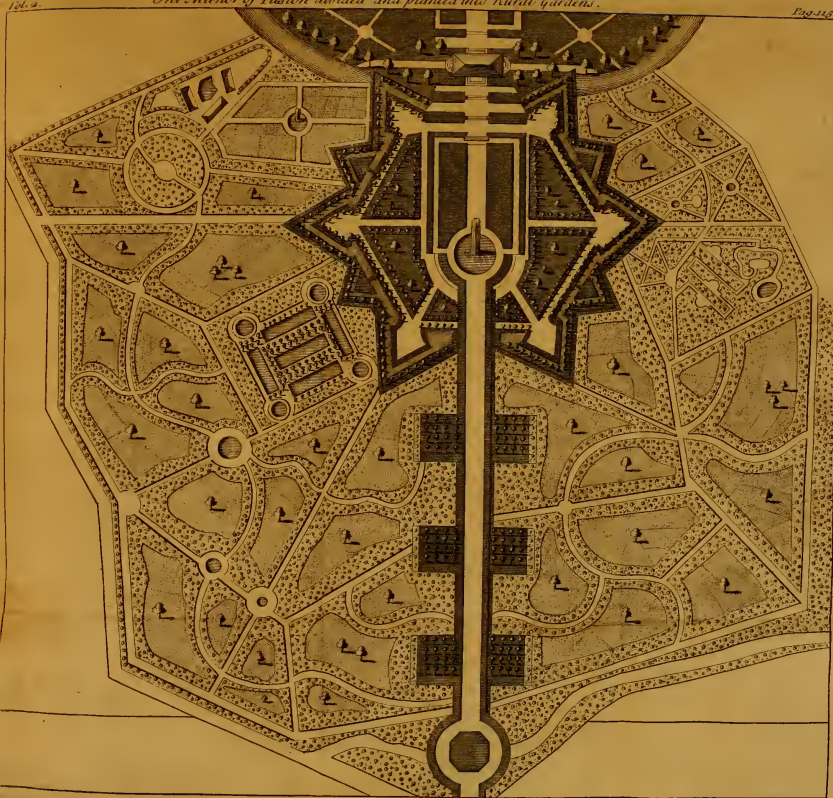
more Certainty and Clearness, I have illustrated by a Scheme in the next Plate, *Fig. 13.*

If you would enlarge your Map, place your little Draught on the Middle of your Paper, whereon you design to draw it larger; and, fixing upon one common Center, (no great Matter where, but somewhere in the Middle) and extend the Angles, or radiant Lines, with your black Lead Pencil, every where throughout your Plott; as you see the Lines A B C, &c. are in the 13th Figure of the the next Plate.

There are Compasses to be bought, that are larger at one End than the other, and by that Means more expeditiously perform this Work; but if such are wanting, it is done by altering the Compasses from one Scale to another.

This, then, is the Method you are to take, after you have extended the *Radius*-Lines: Or you may do it by the Side of the Rule only, without drawing these Lines; and, as in the Example, the Lines A B be 100 Foot, Perches, or Chains, or any other Number, drawn on a Scale of 200 or 100 to an Inch; and you are to enlarge it to 50, which is an usual Scale in Gardening, tho' Learners oft use 24 or 30 Parts in an Inch.

It is very obvious, how the same is to be set off upon that, and all the other Radiant Lines; and by marking the Angles with 1, 2, 3, 4, &c. in Pencil, that it may be afterward rubb'd out, you, when all the Points are laid down, draw the Line. But the whole
Pro-



Proceeding is so plain on the Paper, that I need not enlarge on it in Words.

And the same Method that is taken in the enlarging a Map, is taken in the contracting thereof.

In order to have the more Room to begin one's Work, clear off all Lines wrought, to fix the Center in the largest Field in the whole Plan, be it either on one Side or the other, so will the Lines, in more Probability, be clear of the little Draught; but if they are not clear of it, 'tis easy, by Inspection from given Lines, to lay down the Angles and Intersections, and from thence the Lines that are hid under that Paper.

See the Method in Figure 13 of the next Plate.

I might, in this Chapter of Instruments, have given the Cutts of the several Instruments to be us'd in Surveying and Gardening; but they are now so very well known, that I think it needless; and all that I shall add to this Chapter, is concerning the Square Level and Boning-Staves, Arrows, &c. made Use of in Gardening. It would be ridiculous for me to give an Account of the Make, Fashion, and Use of a Rake, or Spade, &c. but these are not so well known; and I take Mr. *James's* Translation to be deficient in that Kind.

The Description and Use of the Measuring-Rods, Square-Level, Boning-Staves, &c. made Use of in setting out Gardens.

THE 1st is a Measuring-Rod of 10 Foot long, divided into Feet, Halves, and Quarters; and a Foot at one End into the 12 Inches: This is very light and commodious for measuring short Lengths (as the Chain is in measuring great Distances) and even a Gentleman himself ought to have one of five Foot long, to carry in his Hand amongst his Work-men, to be ever and anon measuring and proving their Work by it. They are both commonly made of Deal, the first an Inch and an half or two Inches square; the latter an Inch square, both tapering from the Middle to the Top.

The next is a Level of 10 Foot long, and a Piece of Deal, fram'd exactly into the Middle; and at right Angles with the Bottom, a Raze made therein; and a Hole made at the Bottom for a Lead-Plumb (fasten'd from a Line at the Top) to play in that Hole, by which we know when 'tis level. But this ought to be often prov'd, because it will cast lying and being us'd Abroad; and when you are using it, to see that you don't mistake, you are to try it, End for End, on the Heads of your Stakes. But this Instrument is so common

mon amongst all Sorts of Workmen, that I need say no more of it.

The next are what we call Boning or Levelling Staves. They are all four Foot and an half long; and there are three of them, one to be carry'd by the Gardener, the other by a strong Labourer that can drive Stakes in, and the third by a Boy, on the Top of whose Staff there ought to be ty'd a Piece of white Paper, and a square black Board on the Top, nail'd sloping on the Back-side of it, to retain the Strength of the white Paper the better.

The Use of all these will better appear hereafter, when we come to speak of setting out Gardens.

Of dividing Lands.

§. 2. **T**HE dividing of Lands well, and with Dispatch, is so essential to our present Purpose, that I could not but bestow this Section on that Subject, taken from a very ingenious Author, whose Name I have mention'd in the *Preface*.

How to divide a Triangle several Ways.

Suppose A B C (Fig. 1. of the next Plate) to be a triangular Piece of Land containing

60 Acres, to be divided between two Men; the one to have 40 Acres cut off towards A, and the other 20 Acres towards C, and the Line of Division to proceed from the Angle B. First measure the Base A C, viz. 50 Chains or Links; then say, by the *Rule of Three*, If the whole Content, 60 Acres, give 50 Chains for its Base, what shall 40 Acres give? Multiply and divide, the Quotient will be 33 ch. 33 li., which set off upon the Base, from A to D, and draw the Line B D, which shall divide the Triangle, as was requir'd. If it had been requir'd to have divided the same into 3, 4, 5, or more unequal Parts, you must, in like Manner as Merchants part their Gain, by the *Rule of Fellowship*.

There are several Ways of doing this by Geometry, without the Help of Arithmetick; but my Business is not to shew you what may be done, but to shew how to do it the most easy and practicable Way.

How to divide a triangular Piece of Land into any Number of equal and unequal Parts, by Lines proceeding from any Point assign'd in any Side thereof.

Let A B C (Fig. 2. of the next Plate) be the triangular Piece of Land, containing 60 Acres, to be divided between three Men; the first to have 15 Acres, the second 20, and the third 25 Acres, and the Lines of Division to pro-

Fig. 1.

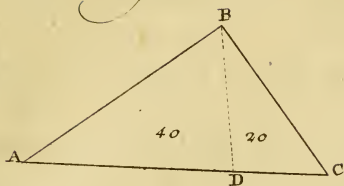


Fig. 2.

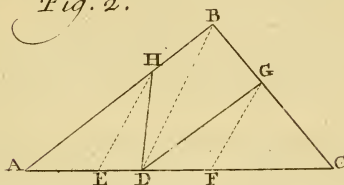
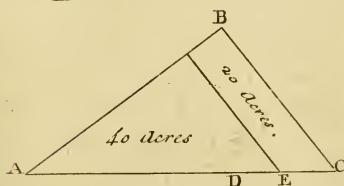


Fig. 3.



proceed from D. First measure the Base into three Parts, as you have been before taught, by saying, If 60 give 50, what shall 15 give? Answer, 12 Chains 50 Links for the first Man's Base; which set off from A to E. Again, say, If 60 give 50, what shall 20 give? Answer, 16 Chains 66 Links for the second Man's Base, which set off from E to F; then, consequently, the third Man's Base, viz. from F to C, must be 20 Chains 84 Links. This done, draw an obscure Line from the Point assign'd D to the opposite Angle B; and from E and F draw the Lines EH and FG parallel to BD. Lastly, from D draw the Lines DH, DG, which shall divide the Triangle into three such Parts as was requir'd.

How to divide a triangular Piece of Land according to any Proportion given, by a Line parallel to one of the Sides.

A B C is the triangular Piece of Land, (*vide* Fig. 3. of the next Plate) containing 60 Acres, the Base is 50 Chains; this Piece of Land is to be divided between two Men, by a Line parallel to B C, in such Proportion, that one have 40 Acres, the other 20.

First, divide the Base, as has been before taught, and the Point of Division will fall in D, A D being 33 Chains 33 Links, and D C 16 Chains 67 Links. Secondly, find a mean Proportion between A D and A C, by multiplying the whole Base 50 by A D 33, 33 the Product

Product is 16665000 ; of which Sum extract the Root, which is 40 Chains 82 Links, which set off from A to E. Lastly, From E draw a Line parallel to B C, as in the Lines E F, which divides the Triangle, as demanded.

Of dividing four-sided Figures, or Trapezia.

Before I begin to teach you how to divide Pieces of Land of four Sides, it is convenient first to shew you how to change any four-sided Figure into a Triangle; which done, the Work will be the same as in dividing Triangles.

How to reduce a Trapezium into a Triangle, by Lines drawn from any Angle thereof.

Let A B C D (Fig. 4 of the next Plate) be the Trapezium to be reduc'd into a Triangle, and B the Angle assign'd; draw the dark Line B D, and from C make a Line parallel thereto, as C E; extend also the Base A D, 'til it meet C E in E; then draw the Line B E, which shall make the Triangle A B E equal to the Trapezium A B C D.

Now, to divide this Trapezium according to any assign'd Proportion, is no more but to divide the Triangle A B E, as before taught; which will also divide the Trapezium.

Example.

Fig. 7.

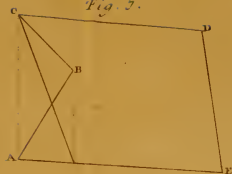


Fig. 6.

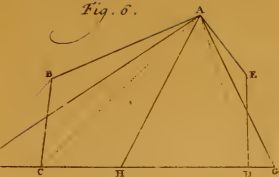
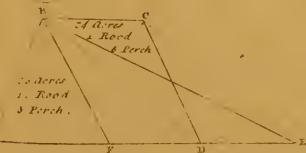


Fig 6



Fig. 4.



Example.

Suppose the Trapezium A B C D, containing 124 Acres, 3 Roods, and 8 Perches, is to be divided between two Men; the first to have 50 Acres, 2 Roods, and 3 Perches; the other, 74 Acres, 1 Rood, and 5 Perches; and the Line of Division to proceed from B. First, reduce all the Acres and Roods into Perches; then will the Content of the Trapezium be 19968 Perches; the first Man's Share 8083 Perches, the second Man's 11885. Secondly, measure the Base of the Triangle, *viz.* 70 Chains no Links: Then say, If 19968, the whole Content, give for its Base 78 Chains no Links, what shall 8083, the first Man's Part, give? Answer, 31 Chains, 52 Links, which set off from A to F, and drawing the Line F B, you divide the Trapezium as desir'd; the Triangle A B F being the first Man's Portion, and the Trapezium B C F D the second's.

How to reduce a Trapezium into a Triangle, by Lines drawn from a Point assign'd in any Side thereof.

A B C D (Fig. 5 of the next Plate) is the Trapezium; E the Point assign'd, from whence to reduce it into a Triangle, and run the Division-Line, the Trapezium is of the same Content as the former, *viz.* 19968 Perches; and it is to be divided as before, *viz.* one Man to have

have 8083 Perches, and the other 11885. First, to reduce it into a Triangle, draw the Lines ED , EC , and from A and B make Lines parallel to them, as AF , BG ; then draw the Lines EG , EF , and the Triangle CFG , will be equal to the Trapezium $ABCD$, which is divided as before; for when you have found, by the *Rule of Proportion*, what the first Man's Base must be, viz. 31 Chains 52 Links, set it from F to H , and draw the Line HE , which shall divide the Trapezium according to the former Proportion.

How to reduce an irregular five sided Figure into a Triangle, and to divide the same.

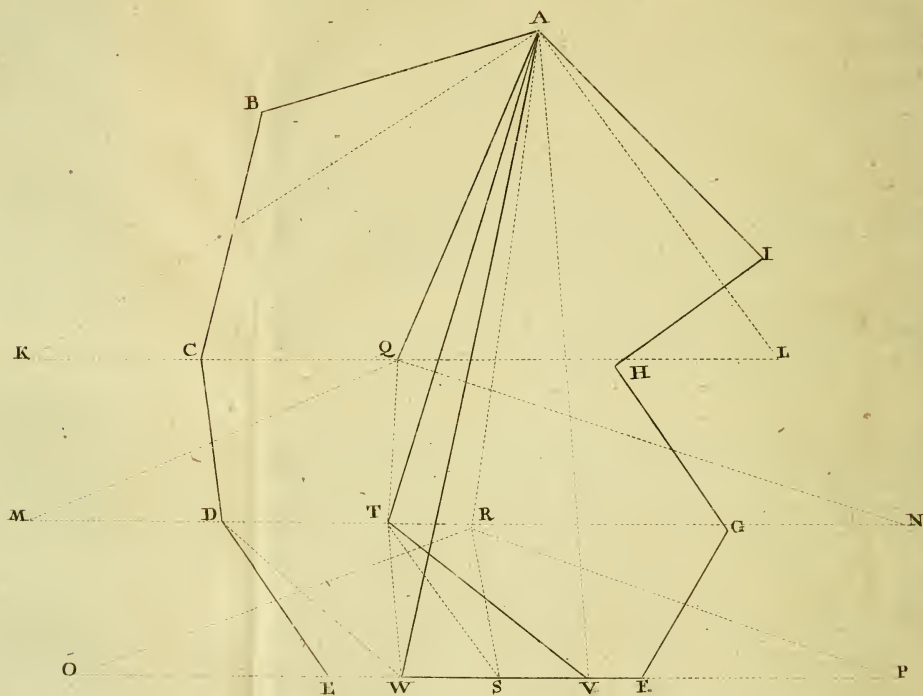
Let $ABCDE$ (Fig. 16 of the next Plate) be the five-sided Figure; to reduce which into a Triangle, draw the Lines AC , AD , and parallel thereto BF , EG , extending the Base from C to F , and from D to G ; then draw the Lines AF , AG , which will make the Triangle AFG equal to the five-sided Figure. If this was to be divided into two equal Parts, take the half of the Base of the Triangle, which is FH , and from H draw the Line HA , which divides the Figure $ABCDE$ into two equal Parts. The like you may do for any other Proportion.

If

ided Figure, A B C H I, which reduce into the Triangle A K L, and measuring half the Base thereof, which will fall at Q, draw the Line Q A.

Secondly, Draw the Line M N, and from the Point Q reduce the Trapezium, C D G H, into

Fig. 7.



Parts. The like you may do for any other
 Proportion. The like you may do for any other
 Trapezium: the four sides of the
 to reduce it into a Triangle, and use the Di-
 vision: for the Trapezium is of the same Con-
 if as the former, was 1068 Feet, and
 it is to be divided as before, and
 6705

If in dividing the Plott of a Field, there be outward Angles, you may change them after the following Manner.

Suppose $A B C D E$ (Fig. 7 of the next Plate) be the Plot of a Field, and B the outward Angle, draw the Line $C A$, and parallel thereto the Line $B F$. Lastly, the Line $C F$ shall be of as much more Force as the Lines $C B$ and $B A$; so is that five-sided Figure, having one outward Angle, reduc'd into a four-sided Figure, or Trapezium; which you may again reduce into a Triangle, as has been before taught.

How to divide an irregular Plot, of any Number of Sides, according to any given Proportion, by a strait Line thro' it.

$A B C D E F G H I$ (Fig. 7 of the next Plate) is a Field to be divided between 2 Men, equal Halfs, by a strait Line proceeding from A . First, consider how to divide the Field into five-sided Figures, and Trapezia, that you may the better reduce it into Triangles: As by drawing the Line $K L$, you cut off the five-sided Figure, $A B C H I$, which reduce into the Triangle $A K L$, and measuring half the Base thereof, which will fall at Q , draw the Line $Q A$.

Secondly, Draw the Line $M N$, and from the Point Q reduce the Trapezium, $C D G H$,
into

into the Triangle $M N Q$; which again divide into half, and draw the Line $Q R$.

Thirdly. From the Point R reduce the Trapezium $D E F G$ into the Triangle $R O P$; and taking half the Base thereof, draw the Line $R S$, and then have you divided this irregular Figure into two equal Parts, by the three Lines, $A Q$, $Q R$, $R S$.

Fourthly. Draw the Line $A R$, also $Q T$ parallel thereto; draw also $A T$, and then you have turn'd two of the Lines into one.

Fifthly. From T draw the Line $T S$, and parallel thereto the Line $R V$; draw also $T V$; then is your Figure divided into two equal Parts, by the two Lines $A T$ and $T V$.

Lastly. Draw the Line $A V$, and parallel thereto $T W$; draw also $A W$, which will cut the Figure into two equal Parts, by a strait Line, as was requir'd. You may, if you please, divide such a Figure all into Triangles, and then divide each Triangle from the Point where the Division of the last fell, and then will your Figure be divided by a crooked Line, which you may bring into a strait one, as above. This above is a good Way of dividing Lands; but Surveyors seldom take so much Pains about it; I shall therefore shew you how they commonly abbreviate their Work, and is, indeed,



Fig. 8.

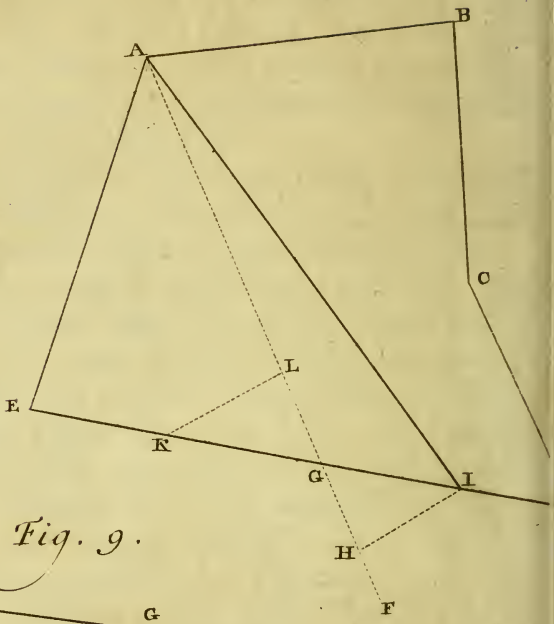
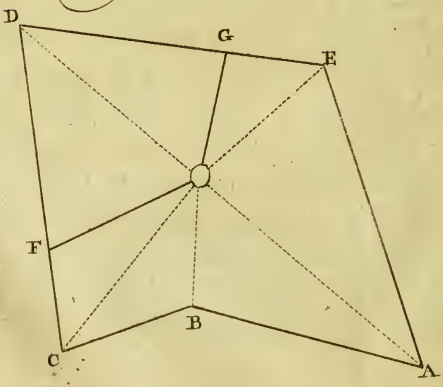


Fig. 9.




An easy Way of dividing Lands.

Admit the following Figure, A B C D E, (Fig. 8 in the next Plate) contains 46 Acres, to be divided in Halves between two Men, by a Line proceeding from A. Draw, first, a Line, by Guess, thro' the Figure, as the Line A F; then cast up the Content of either Half, and see what it wants, or what it is more than the true Half should be; as for Example, I cast up the Content of A E G, and find it to be but 15 Acres, whereas the true Half is 23 Acres; 8 Acres being in the Part A B C D G more A E G; therefore I make a Triangle, containing 8 Acres, and add to it A E G, as the Triangle A G I; then the Line A I parts the Figures into equal Halves.

But more plainly how to make this Triangle; measure, first, the Line A G, which is 23 Chains 60 Links; double the 8 Acres, they make 16; to which add five Cyphers, to turn them into Chains and Links, and then they make 1600000; which divide by A G 2360, the Quotient is 6 Chains 77 Links. For the Perpendicular, H I, take from your Scale 6 Chains 77 Links, and set it so from the Base A G F, that the End of the Perpendicular may just touch the Line E D, which will be at I. Then draw the Line A I, which makes the Triangle A G I just 8 Acres, and divides the whole Figure, as desir'd.

If it had been requir'd to have set off the Perpendicular the other Way, you must still have

have the End of it but just touch the Line E D, as L K does; for the Triangle A K G, is equal to the Triangle A G L, each 8 Acres. And thus you may divide any Piece of Land of never so many Sides and Angles, according to any Proportion, by strait Lines through it, with as much Certainty, and more Ease, than the former Way.

 You might also have drawn the Line A D, and measur'd the Triangle A G D, and afterwards have divided the Base G D, according to Proportion, in the Point I, which I'll make more plain in this following Example.

Suppose the following Field, (Fig. 9 of the next Plate) containing 27 Acres, is to be divided between three Men, each to have nine Acres; and in the Lines of Division, to run from a Pond in the Field, so that every one may have the Benefit of the Water, without going over one another's Ground.

First, from the Pond \odot draw Lines to every Angle, as $\odot A$, $\odot B$, $\odot C$, $\odot D$, $\odot E$, and then is the Figure divided into five Triangles, each of which measure, and put the Contents down severally; which Contents reduce all into Perches; so will the Triangle

$$\begin{array}{l} A \odot B \\ B \odot C \\ C \odot D \\ D \odot E \\ E \odot A \end{array} \left. \vphantom{\begin{array}{l} A \odot B \\ B \odot C \\ C \odot D \\ D \odot E \\ E \odot A \end{array}} \right\} \text{be } \left\{ \begin{array}{l} 674 \\ 390 \\ 1238 \\ 911 \\ 1107 \end{array} \right\} \text{Perches;}$$

the whole Content being 4320 Perches, or 27 Acres; each Man's Proportion 1440 Perches.

From

From \odot to any Angle draw a Line, for the first Division-Line, as $\odot A$; then consider that the first Angle $A \odot B$ is but 674 Perches, and the second $B \odot C$ 390, both together 1064 Perches less by 376 than 1440, one Man's Proportion: You must therefore cut off from the third Angle, $C \odot D$, 376 Perches for the first Man's Dividing-Line; which thus you may do: The Base DC is 18 Ch. the Content of the Triangle 1238 Perches; say then, If 1238 Perches give Base 18 Ch. no Links, what shall 376 Perches give? Answer, 5 Chains 45 Links, which set off from C to F , and drawing the Line $\odot F$, you have the first Man's Part, *viz.* $A \odot F$.

Secondly, See what remains of the Triangle $C \odot D$, 376 being taken out, and you will find it to be 862 Perches, which is less by 578 than 1440. Therefore from the Triangle $D \odot E$ cut off 578 Perches, and the Point of Division will fall in G ; draw the Line $\odot G$, which, with $\odot A$ and $\odot F$, divides the Figure into three equal Parts.

How to divide a Circle, according to any Proportion, by a Line concentrick with the first.

All Circles are in Proportion to one another, as the Squares of their Diameters; therefore, if you divide the Square of the Diameter or Semidiameter, and extract the Root, you will have your Desire.

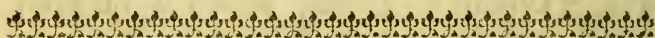
K

Example.

Example.

Let A B C D be a Circle, to be equally divided between two Men.

The Diameter whereof is 2 Chains, the Semi-diameter 1 Chain, or 100 Links; the Square thereof 10100, half the Square 5050, the Root of the Half 71 Links, which take from your Scale, and upon the same Center draw the Circle G E H F, which divides the Circle A B C D into equal Parts.

*Of laying out new Lands.*

A certain Quantity of Acres being given, how to lay out the same in a Square-Figure.

ANnex to the Number of Acres given 5 Cyphers, which will turn the Acres into Links; then from the Number thus increas'd extract the Root, which shall be the Side of the propos'd Square.

Example.

Suppose the Number given be 100 Acres, which I am to lay out in a Square Figure, I join to the 100 5 Cyphers, and then 'tis 100,00000 square Links, the Root of which is 3162 nearest, or 31 Chains 62 Links, the
Length

Fig. 10.

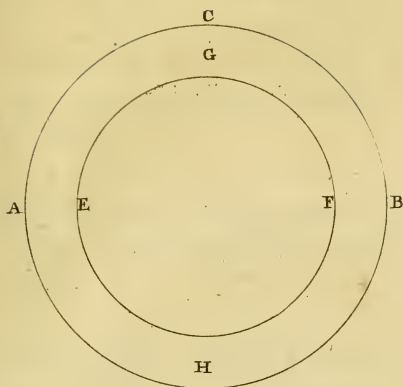
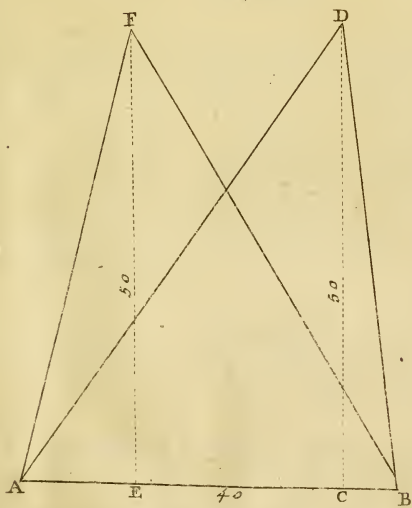
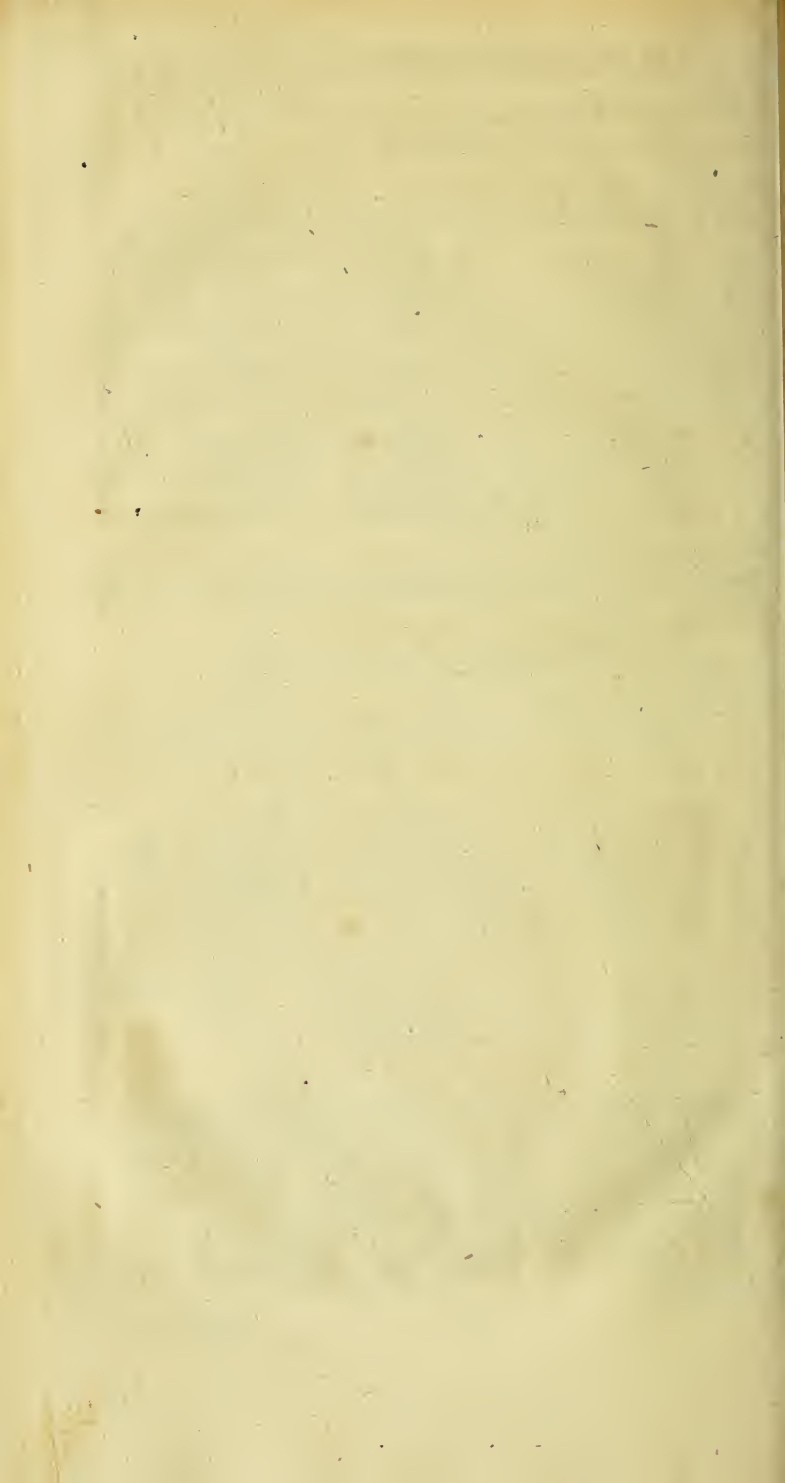


Fig. 11.





Length of one Side of the Square. Again, if it were to cut out of a Corn-Field one square Acre, I add to one five Cyphers, and then 'tis 100000, the Root of which is 3 Chains 16 Links, and something more, for the Side of that Acre.

How to lay out any given Quantity of Acres in a Parallelogram, whereof one Side is given-

Turn, first, the Acres into Links, by adding, as before, 5 Cyphers; that Number thus increas'd, divide by the given Side; the Quotient will be the other Side.

Example.

It is requir'd to lay out 100 Acres in a Parallelogram, one Side of which shall be 20 Chains 00 Links: First, to the 100 Acres I add 5 Cyphers, and it is 10000000, which I divide by 20 Chains no Links; the Quotient is 50 Chains no Links, for the other Side of the Parallelogram.

How to lay out a Parallelogram that shall be 4, 5, 6, or 7, &c. times longer than 'tis broad.

To do which, first, above taught, turn the given Quantity of Acres into Links, by annexing 5 Cyphers, which Sum divide by the Number given for the Proportion, between

the Length and Breadth, as 4, 5, 6, 7, &c. the Root of the Quotient will shew the shortest Side of such a Parallelogram.

Example.

Admit it were to be requir'd of me, to lay out 100 Acres in a Parallelogram, that should be five times as long as broad: First, to the 100 Acres I add 5 Cyphers, that makes it 10000000, which Sum I divide by 5, the Quotient is 2000000, the Root of which is nearest 14 Chains 14 Links; and that, I say, shall be the short Side of such a Parallelogram, and by multiplying that 1414 by 5, shews me the longest Side thereof to be 70 Chains 70 Links.

How to make a Triangle, that shall contain any Number of Acres, being confin'd to a certain Base.

Double the given Number of Acres (to which annex, first, 5 Cyphers) divide by the Base, the Quotient will be the Length of the Perpendicular.

Example.

Upon a Base (Fig. 11. of the next Plate) given, that is in Length 40 Chains no Links, I am to make a Triangle that shall contain 100 Acres: First, I double the 100 Acres, and annexing 5 Cyphers thereto, it makes

20000000,

20000000, which I divide by 40 Chains no Links, the limited Base; the Quotient is 50 Chains no Links, for the Height of the Perpendicular, as in this Figure: A B is the given Base 40, upon any Part of which Base I set the Perpendicular 50, as at C; then the Perpendicular is C D; therefore I draw the Lines D A, D B, which make the Triangle D A B to contain just 100 Acres, as requir'd: Or if I had set the Perpendicular at E, then would E F have been the Perpendicular 50; and by drawing the Lines F A B, containing 100 Acres, the same as D A B. If you consider this well, when you are laying out a new Piece of Land, of any given Content, in any Place, although you in your Way want 100 Lines and Angles, yet you may, by making a Triangle to the first Station you began at, cut off any Quantity requir'd.

How to find the Length of the Diameter of a Circle, which shall contain any Number of Acres requir'd.

Say, as 11 is to 14, so will the Number of Acres given be to the Square of the Diameter of the Circle requir'd.

Example.

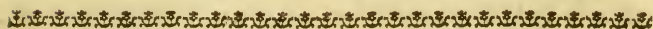
What is the Length of a Diameter of a Circle, whose superficial Content shall be 100 Acres? Add five Cyphers to the 100, and it makes 10000000 Links; which, multiply'd by 14, *facit* 140000000; which, divided by 11, gives for Quotient 12727272, the Root of which is 55 Chains 67 Links, and better, almost 68 Links; and so much shall be the Diameter of the requir'd Circle.





CHAP. IV.

Of COURT-YARDS.



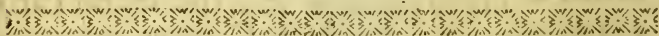
*Of the several Parts of which GARDENS
are compos'd.*

BEFORE I enter upon the main Design of this Work, *viz.* *Rural and Extensive Gardening*, it will be requisite to examine into the several Parts and Proportions of which Gardens are compos'd, that so those several Parts, and the particular Proportions of each being adjusted, and some Designs at large given for the interior Centers and Divisions of Wood, and other Parts of a Garden, the latter Part may be understood with more Ease; for that being of an extensive Nature, and the Scale very small, 'tis impossible to shew these Particulars to any

great Nicety, so as to recommend them to Use, and the Practice of Gardeners and Designers.

Mr. *James's* Translation, indeed, goes before; and, besides, he has had the most magnificent Gardens of all *France* to view, and he has certainly chose the very Marrow and Beauty of all those excellent Designs; so that, in this Point, I must expect to fall very far short of him; which will be, I hope, excus'd, when 'tis consider'd, that I have writ this Treatise in a Country that does not yet abound with such truly noble Gardens as *France* does, tho' we are by Nature so much better enabled to do it. But this will, 'tis hop'd, tempt some of our curious *Planometrians*, in Time to come, to finish what is here so imperfectly begun.

And for the rest, if Providence permits, I hope, on the Spot, in these Countries, to collect what may yet farther advance us in the Knowledge and Improvements of Horticulture, and other rural Amusements.



Of COURT-YARDS.

COURT-YARDS are by the *Latins* call'd *Area*, *quia ibi arescunt fruges*, says *Varro*, an ancient Writer of Husbandry amongst the *Romans*; and with us, *Court-Yards*; *Court*, from the *French*, and *Yard*, a Term of our own, and is, in its proper Signification, an
open

open, airy Drying-Place, *quia exaruerit*, as the Dictionary expresseth it, and bounded with a Wall, Hedge, or Pale, or some Circumscription, as Courts of Law and Justice are; but when particularly apply'd to the Matter in Hand, signifies those little Divisions that lye contiguous to a Gentleman's House, and other his Offices of Convenience.

But to the Work itself, *viz.* To the Proportion and Design, and to the Manner of making of them.

Where-ever, then, the Design admits of, or requires but one single Court, the Length thereof need be no more than once and an half or twice the Width between Terrace and Terrace. But in very great Edifices and Designs, a double Court seems to add a great Magnificence thereto; 'tis there that Grandeur is absolutely necessary, when in Buildings of a less Account, a single Court, according to our allotted Proportion, will very well answer the Purpose.

I have, in Plates the 1st and 2d, given such plain Directions, as have occur'd in the Disposition and making of Court-Yards, whether publick or private, of their Use, and the Beauty and Convenience they add to any Edifice.

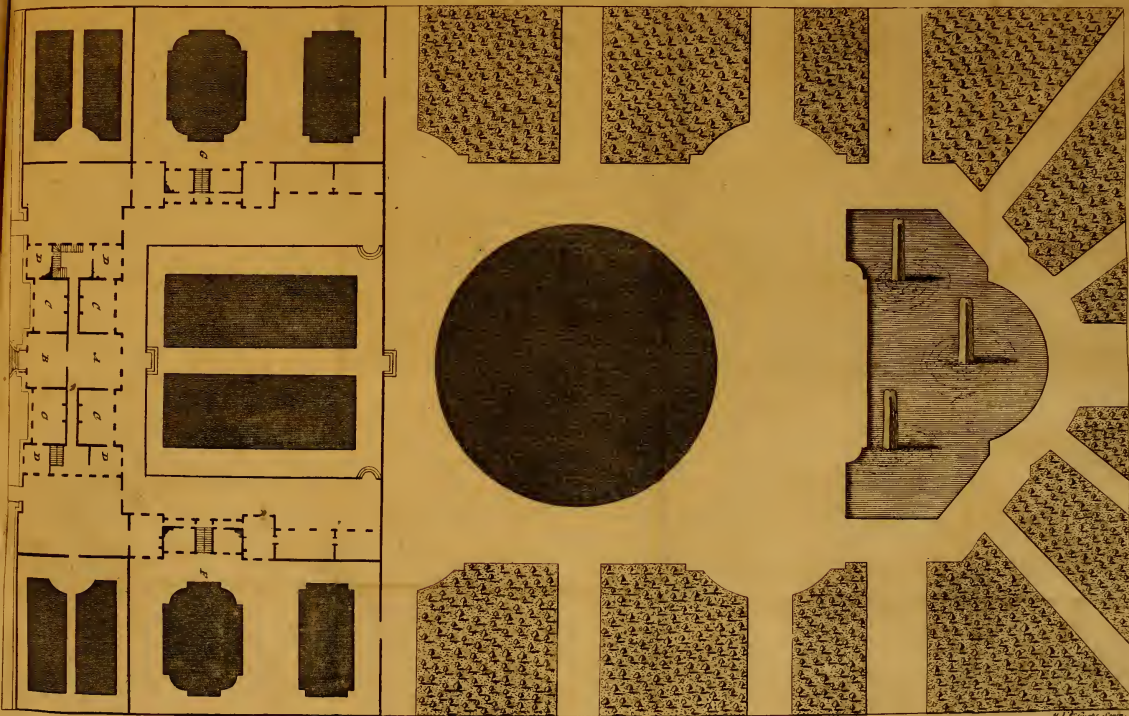
In the first Place it is requir'd, that Court-Yards should have a depending Level, at least an Inch in ten Foot, for the quick carrying off of Water, and that it may lye dry, as much as possible. To that End, there will be found in Plate the 25th a circular Line, to which
all

all the rest of the Court should lye rounding, under which there ought to be Drains for the Conveyance of the Water. This Declension, that is just mention'd, is not only of Use, but is also of considerable Advantage in the elevating the House, and giving a good Prospect to the distant Beholder, which is what many Houses want. And 'tis not of the least, but, on the contrary, the greatest Beauty, Advantage, and Conveniency imaginable, to have a Terrace-Walk round, or by the Side of, a Court; for by it the House is still elevated the higher to any Person that comes in upon the grand Level of the Court-Yard, be he either on Foot or Horse-back; besides the Cleanness, Decency, and Convenience there is for Servants and others, that pass on Foot from one Office to another. In Truth, it ought to be the chief Care of any Surveyor, to give his House all the Elevation he can; but of that more by-and-by.

In the 2d Place, the Foundation of a Court-Yard, or, to speak more intelligibly, the pitching, ought to be firmly fix'd in the Earth. But these being the Employs of a particular Trade, I shall leave it to them.

A Description of the 25th Plate, (of Court-Yards.)

The principal Part of my Design in this Plate, is to shew my Reader (by Way of Preliminary)



liminary) the Nature of a grand Court, which may serve as a Specimen in a very large Design, as it is here particularly calculated for a middling one. I have not been (neither, indeed, is it my Business to be) very exact, either in the Magnitude or Distribution of the several Rooms in a Building; but every Gardener ought to know the Disposition of the Building in general, that he may conduct his Design accordingly. But as this Plate has chiefly Relation to the great Court, there is no Occasion to expatiate at present upon those Matters, but leave them to be treated of, or describ'd, in some other Plate or Place.

The Peruser may then collect by the Scale, that the Width between the Wings is about 230 Foot, and the Breadth of the Wings 50 Foot, which make 280 Foot; but, as we generally account the Measure between the two Wings for the Breadth, 'tis there I fix my Standard; and have therefore made the Length from the great Hall-Door to the Gate-way near 330 Foot; which is near what I propos'd to allow for the Proportion of a Court-Yard, supposing there is to be allow'd (as, indeed, there ought to be) a large Parade without the Gates, which, with all other contiguous Yards and Courts, will be describ'd in a particular Plate, upon a less Scale in its due Place.

In the mean while, as to the farther Description of this, there is in this Design not only round the Building, but also quite round
the

the Court, a Terrace-Walk, which is what, in my humble Opinion, is very deficient in all Books and Designs that I have seen; for it is not only a dry clean Pavement to walk round, and view the Edifice, but also thereby the Building itself appears considerably the higher. And tho' it may be objected, that the Terrace at the farther End will stop the View, I shall advise, that this Terrace is only to be us'd, where a handsom depending Level can be had, (as it is here suppos'd it may) for which Reason here is suppos'd 3 Foot 6 Inches fall in the Court itself, from A to B, the Height of the Terrace above A is two Foot, and the Basement is higher than the Terrace at the Entry into the Hall, five Foot, besides the Height of a Man, which is at least 5 Foot more, is in all 10 Foot and an half; and this is (allowing two Foot and an half for the Height of the Parapet above the Terrace-Walk) full 3 Foot higher than the Terrace-Walk at the End of the Court. In order to take away all Objection, I have likewise, at the Bottom of the Offices, at C, fall'n two Foot more; so that then the Floor of the Hall is full five Foot above the Parapet of the Terrace at the End of the Court; and if to that be added 5 Foot, the common Height of a Man, I can't conceive that any Objection can be made to this Way of Design.

In Addition to the foremention'd Conveniency of a Terrace-Walk round a Court, let me mention, that it likewise disposeth of all
 Stuff

Stuff that is dug out of Cellars, and the other Foundations of a House, and all other waste Rubbish, and Clay, as useless Ground, that would be to cart away ; and therefore it is recommended on that Account : And the Reason why a Terrace-Walk at the End is urg'd, is the Expence it saves in Iron-Work, which, at best, is but a Kind of Net-Work, I had almost said, contriv'd on Purpose to catch those Persons in, who are so unwise as to run to that great and unnecessary Expence.

If therefore the Ground should rise from the House, instead of fall, one ought by all means to sink it, and for a Fence to dig a Graft, or Ditch, on the Out-side, (of which much more will be said, when we come to the fencing in of a Garden) for the effectual Security of this main Court, and the other Offices, &c. But in this whole Matter, *viz.* in placing the Terrace-Walk and Basement of a new Building, there ought to be a great deal of Care. Come we now to speak of the Superficies of this and all such Courts.

And here it must be observ'd, that, for the Conveniency of coming in for a Coach and Horses, I have given 70 Foot Distance from the Edge of the Terrace, at the Bottom of the Court, to the Edge of the Oval ; and the other End is not above 16 Foot from the Steps of the Terrace, at the upper End next the House, mark'd A ; for 'tis easy to conceive the Difficulty a Coach and Six would meet with at the Entrance, were it any otherwise.

It

It has formerly been the Method, to place a Fountain in the Middle of Court-Yards, or to make, in its Room, a large circular or oval Plott; but this is altogether difus'd at present, since thereby, when there are a great Number of Coaches, it would be no small Trouble for them to stand at Quiet, in so narrow a circular Way, as is commonly allow'd; when by this Means, those that are unemploy'd may easily move out of the Way, upon this Oval, (or any such like Figure) and there remain, 'till they have Occasion to move. In Consequence of this 'tis therefore now the Manner, to pave the grand Court all over; and that they may appear (as all other superficial Ornaments about Country-Seats do, or ought to do) with some Variety, they are commonly pitch'd Chequer and Star-wise, or circular, or in such Form as the ingenious Artist pleases, with different-colour'd Stones. The Method here taken is more easily discover'd by inspecting the Plate, than by many Words.

The last Thing I shall mention, as worth our Notice, is the particular Level which is given to this Court, in order to carry off the Water the better, and the Method of setting them.

The Center of the Oval is exactly a dead Level from A; so that after you have fix'd those two, and mark'd out the great Circle, or Gutter, (under which there ought to be a Drain, two Foot square, with Grates at every twenty Foot Distance) then, I say, for its
Level,

Level, you must at every ten Foot fix in a Stake; or, because of the Drain, let it be rather of Brick or Tiles laid upon one another, 'til they are at their proper Level, allowing an Inch and an half Fall to every ten Foot, and that will make the true Level, all the other Lines swimming (as we commonly term it) from the Plinth of the Terrace-Wall that is on each Side the Court, and from the Center of the Oval down to that Level in the Hollow, Gutter, or Drain.

As the Court is thus pitch'd, and of a depending Level, if it be a Stone Country, all the Terraces round should be pav'd, and even that that is at the farther End of the Court. And this Terrace must of Necessity be of a dead Level, that it may answer the Basement and Plinth of the main Building, and likewise the Wall, or Parapet, that supports the Terrace, all the Lines lying swimming from it, down to the Hollow, as has been before observ'd.

It is easy to conceive the Neatness, Beauty, and Cleanness, that there is in Courts of this Kind, more than in those whose Horse and Foot go together. Besides, that this little Elevation is of Advantage to the Heighth of a Building, every Body will, I dare say, readily own; so that a Terrace-Walk round the Court of a magnificent, or even of any small Rate of Building, is absolutely necessary, if the Owner would keep his Foot-Passages clean, and give a proper Elevation to his Building.

I hope I shall be excus'd pressing of this so much, because we are every Day seeing the contrary; except in Buildings that are under the Management of some of the top Architects, amongst which may be deservedly plac'd Sir *John Vanbrugh*, and Mr. *Hawksmore*.

I shall do no more in this Chapter, but add some few explanatory Notes upon the general Disposition of the Plan of this Edifice, which does in a great Measure determine the Nature of all the adjacent Courts.

1. The great Hall.
2. The Salloon Room.
3. The great Dining-Room.
4. The little Dining-Room.
5. The Green-House, or Gallery.

There seems to be no Occasion of marking any of the rest, they being either private Apartments or Offices; and the little Gardens that lye contiguous thereto, may be easily observ'd to answer their Designs and Use, which is Decency and Plainness; but if any should be so curious, as to desire them to be drawn into Borders, or Box-Works, they may apply themselves to several Patterns in this and other Books; and the Truth is, 'tis in that most Gardeners are excellent, and so need little Introduction, their Endeavours scarce reaching any farther.

And

And, in order to exemplify the whole Design, in one of the following Plates will be epitomiz'd the several Parts in one Design, with their Manner of laying out, &c.

A Description of Plate the 26th.

Altho' the first Design be truly noble in its Kind, yet it must be allow'd to be very expensive withal; besides, in Forest or Hunting Seats (as well as the Seats of the more inferior Part of the Gentry) where the Nobility pass away in Happiness Part of their Time, a little more Rurality, and less Expence, will do as well, or better. I can't, indeed, tell how far a Person of my Profession may be allow'd the Liberty of censuring or reproving any Extravagancy of Design in some of inferior Rank of our own Country; but it is certainly too true, that some of them do very much exceed the Limits of their Honour, as they do also of their Estates, in great Designs of Building, and a very expensive Way of Gardening likewise. And whoever takes a Survey of these Kingdom will find, that to this is owing the many confus'd, unfinish'd Schemes so very common in several Parts thereof.

And, in Truth, this first setting out, is generally the Rock that all Mankind split upon; for such Expences are, generally speaking, increas'd double to what they were computed at, and by that Means the Owner's ready Money is commonly expended, before he hath half

L. finish'd

finish'd the Design; and the Remainder is too often, by unavoidable Necessity, left in the utmost Confusion.

I say then, in the first Place, Persons of an inferior Rank ought to be very moderate in their Designs, for building Court-Yards, Offices, &c. that there may the more remain for the Embellishment of the adjacent Fields, Wood, &c. since this will add much more to their Satisfaction and Profit, than the most sumptuous Palace can do. One is (as an ingenious Author observes) from the Moment of its Erection, hastening to its Ruin, while the other is continually improving upon his Hands, and furnishing him with all Necessaries of Life; every Day supplying him with new Objects and Variety to his Taste, Smell, Sight, &c.

A private Gentleman ought therefore (in Wisdom) not to begin his House much larger than what is in this Design; he ought to be very moderate and plain in the Furniture of his Building, and of the Magnificence of his adjacent Gardens and Court-Yards.

This may, perhaps, be thought an improper Chapter for the Inculcation of these Matters; but, as I am going thro' a general Course of Country-Business, I can't pass this Place without it, being, generally, the very Spot and Time, from which all injudicious Undertakers do commonly date their Ruin or Disgrace, and from which the more considerate and frugal commence the greatest Happiness,

ness, that they are (next to the divine Peace and Tranquility of their own Minds) capable of procuring for themselves in this World.

But to go on. The Length of the South Garden Front is about 80 Foot, and the Breadth 35 ; but, by contracting the Scale, the whole Design may be enlarg'd. And if the Owner can with Convenience, it would do still better, if the Garden Front could be 100 Foot ; but this may do, tho' the Rooms are but small, which is in these Times very well approv'd of.

A, in Plate the 26th, is the Hall, B the Dining-Room ; C C C C are Drawings, or Bed-chambers, and D D D D are Closets.

I don't pretend to be exact as to the Building Part ; but something like this is what many Surveyors recommend ; and this I leave to better Judgment.

I would always advise against building many Court-Walls, where Frugality is requir'd ; they soon run up to a great deal of Money ; but 'tis hard to avoid making some few, to enclose these Court or Wood Yards, and to keep Cattel and Deer from running into the very House ; but if any Person would content himself with Elm-Hedges, or, which is better, (but slower of Growth) Holly-Hedge, this would be an impenetrable Fence, would break all the Winds better than Walls, and would always appear in a Forest Manner, and conduct the Eye as well as a Wall.

To effect this the better, you are to plant a small Holly Hedge, or (if near *London*, where Yews and Hollies can be got large) a Hedge four, five, or six Foot high, in the very Line where you might have intended your Wall, *viz.* ranging from the Angles of your Building, as in all Designs they do, or ought to do. But, if the Holly Hedge be not above a Foot high, it does, by that means, make no Manner of Show at present; and therefore there ought to be plac'd, about 3 or 4 Foot behind it, a Row of Hedge-Elms, and those will make an Appearance at once, will shrowd the Holly 'til it is grown up, and will themselves, after that, be fit to prune into Standards, or to plant promiscuously in our rural Plantations.

But it must be noted, that this can't be done near or in Town, but only in the Country; the Town requires high Walls quite round it, but the Country may be more open and less guarded. And now let us follow our Description.

A is the Hall, B the great Dining-Room, C C C C are all Drawing-Rooms, or Bed-chambers, and D D D D are Closets; E is the common Vestibule for Persons that come about Business, F the Kitchen, and G the Laundry-Offices.

This is all I take to be necessary to say as to Court-Yards, or the little Gardens adjoining to the Building. 'Tis obvious enough to every Body, that the other little ones are either to be pav'd, or to be laid with Grass and Gravel,

according as they are either design'd for Use or Beauty. If they are adjoining to the private Apartments of Ladies and Gentlemen, then Flowers, and Edgings, of Thyme, &c. according to the common Method, or their particular Desire; but if adjoining to the Kitchen, for those Kind of Herbs that the Cook is wanting on all Occasions: If to the Laundry, a Bleaching-Yard; and if to the Stables, with Paving, &c.

And with this I shall finish what I have to say in Relation to Court-Yards. What I would advise chiefly, is, by all Means to avoid the Expence of long Court-Walls, especially in Rural and Forest Seats. You are but just enter'd upon your Work, and you must consider, that you have a great many Things to do with your Money; but if you do build in a Town, you must in some Measure submit to it.

But before I quit this Section, I observe, that as soon as ever you are out of Doors, you are in a Forest. This a good Designer would desire by all Means: Wood is of so charming a Nature, as well as Use, that no Man would cut any of it down, except he could not possibly help it, and would only clear it away, that he may have an open Breathing-Place before him, with Ridings thro' it. Nevertheless, if it be not already grown, it may be plac'd farther; but of this more anon.

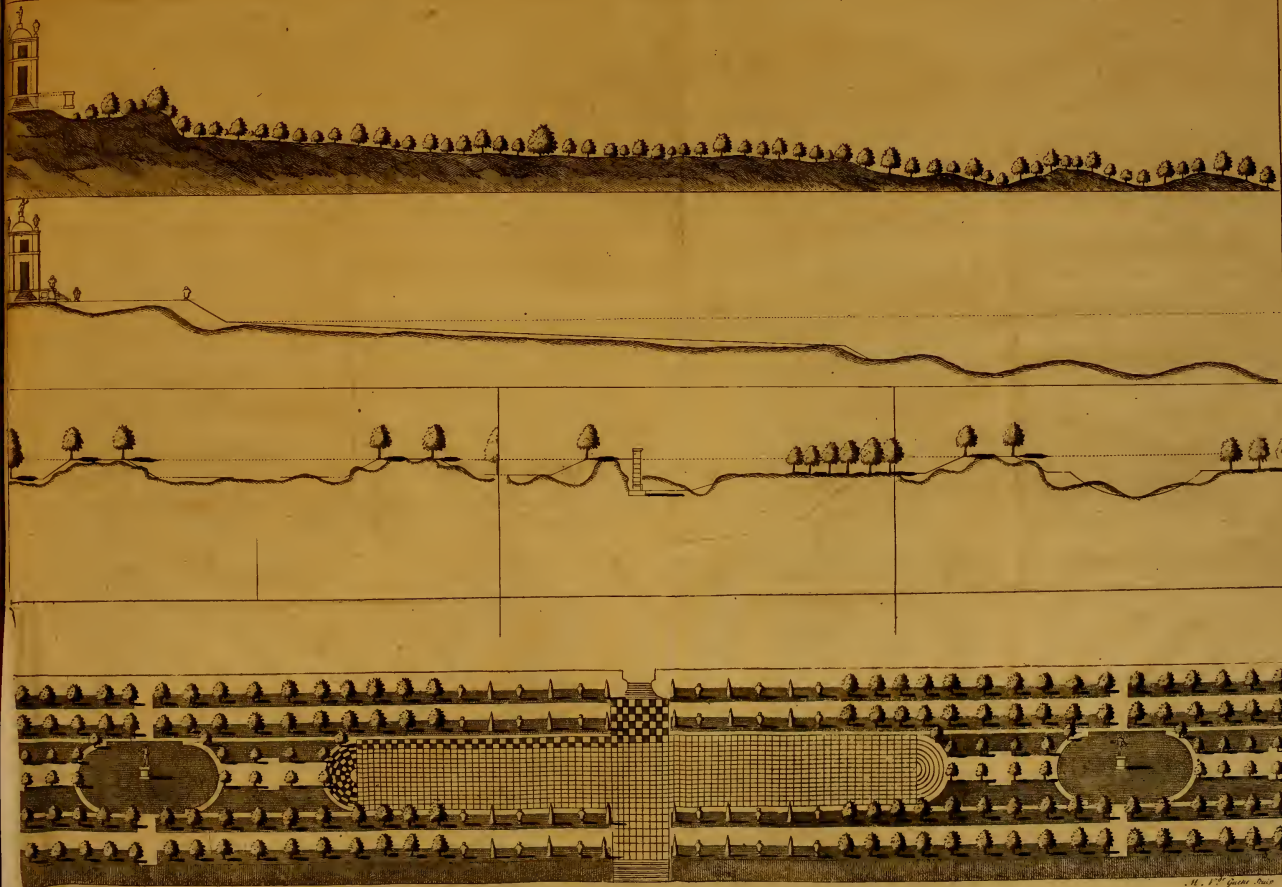


C H A P. V.

Of TERRACE - WALKS.

THE Terrace seems to have been us'd a considerable Time since, the *Latins* terming it *Agger*, or *Aggestus*, as may be suppos'd from *ad* and *gero*, to collect or gather together of an Heap ; *Vitruvius* (that celebrated *Roman Architect*) and *Suetonius*, call it by the Name of *Pulvinus*, a Garden-Bed, or rais'd Walk of Gravel ; *Macrobius*, by *Solarium*, a Sunny Bank, or Walk : But the nearest of our Derivations in *English*, is from the *French*, *Terrace*, or *Terrasse* ; and they from the *Italians*, (from whom they, and almost all *Europe*, derive their Terms of Art relating to Building, Gardening, &c.) *Terraza*, *Terrazare*, signifying with them the removing and banking up of Earth, from one Place into another.

But be the Derivation as it will, it is very well known in these *European Countries*, and particularly with us, to be a small Bank of Earth, laid out and trimm'd according to Line and Level, being necessary for the proper Elevation



levation of any Person that walks round his Garden, to view all that lyes round him. And this Elevation is so necessary, that all Gardens must be esteem'd very deficient, that have them not: And, to be plain, I think it the greatest Fault imaginable in the Author of the *Theory and Practice of Gardening*, that he has not been more particular in that Respect, especially that he has not design'd them next to his main Building, where they are so absolutely necessary, both as to Use and Beauty, that I dare pronounce a Seat of no Value without them; and, besides, where-ever the House is to be new built, there is no Possibility of disposing of the Earth, Clay, Rubbish, &c. that necessarily comes out of the Cellars and Foundation thereof, but this; which we must otherwise suppose (amidst a thousand needless Works) is to be carted away, to fill up some Hollow or other, which had been better left undone perhaps likewise.

Of Terrace-Walks there are several Kinds, as they are particularly us'd.

The 1st, is that great Terrace that lies next the House.

The 2d, Side, or Middle Terrace, that is commonly rais'd or cut out above the Level of the Parterre, Lawn, &c.

The 3d, Those that encompass a Garden; and

The 4th, Many that lye under one another, as being cut out of a large high Hill; these are differing, in some Respect or other, from one another. I shall, in the ensuing Plates, give the Reader the Plan and Use of them all, with such Observations and Directions as are made thereon.

I shall only make some general Observations thereon, before I come to the Plate it self; such are those concerning the Height, Breadth, but little of the Length of Terraces, since that depends on Pleasure. As to the Breadth of all Side-Terraces, 'tis, generally speaking, decided by its Correspondence with some Pavilion, some little Jettee of Building, but most of all by the Quantity of Stuff we have to spare for such Purposes. As the Side-Terrace in a Garden, ought to be never less than twenty Foot, so there is little Occasion to make it wider than forty; but for the Height, which is the chief Occasion of this Paragraph, we may note the Practice of several has been something different one from another; some allowing it to be five Foot high, (which is altogether extravagant) and others more or less, according to their respective Fancies, without any certain Rule.

But the best and most exact Practitioners allow no more than three Foot and an half, and in a narrow Terrace-Walk, and a small Garden, three Foot, and sometimes two Foot and an half higher, are sufficient for a Terrace; then for a Terrace of 20 Foot wide, two Foot
and

and half an Inch, or two Foot nine Inches, is sufficient ; but when it is 30 or 40 Foot, and the Garden proportionably large, 3 Foot, or 3 Foot and an half, is absolutely requir'd.

As to the general Proportion of great Terraces, I refer you to the Scheme and Scale of Plate 27, Fig. 6, by which it appears, that the Terrace is near 100 Foot wide. The Reason why I make it thus large, is, because I have often (I may say always) thought that the Terrace-Walks under Buildings, in almost all the Designs I have seen in *England*, are too narrow, so narrow, that one can't, without a great deal of Inconvenience and Pain, view the Buildings as one walks along. And what gave me the first Impression of this Kind, was that truly magnificent and noble Terrace-Walk belonging to the Right Honourable the Earl of *Nottingham*, at *Burleigh on the Hill* in the County of *Rutland* ; any Person that has once seen this, can't but be mightily shock'd to see little creeping narrow Terraces under great Buildings. For my own Part, I must confess, that that Design creates an Idea in my Mind greater than I am well able to express ; and tho' every Person that builds, has not so noble an Elevation and View, yet Persons in a more level Country, may help themselves very much, and therefore there is the more Occasion for such an Elevation. And this reflects still more upon Mr. *James's* Translation, where there is no such Care taken at all,
nor

nor any Elevation, but what Nature has resolvedly thrown into the Way ; and, in Truth, it looks very mean, to come out of a Building upon the grand Flat of a Lawn or Parterre ; and is a very great Disadvantage to the Gardens at *Hampton-Court*, if it could have been avoided.

Observation on Plate the 26th.

Figure the 1st is the natural Fall of a Hill.

Figure the 2d shews the Descent from the Basement ; and it also demonstrates how easily Gentlemen may, with a little Care at first, give their Buildings an handsome Elevation.

Fig. 3 is the Profile at the End of the Parterre ; and Fig. 4 and 5 are the Boundaries of a Garden by a Terrace-Walk and Graff, and by a Terrace-Walk and Water. Fig. 6 is the Plan of the great Terrace, with Groves of Elms at each End.

To pursue the Thread of our Directions.

When you first begin to build, and make Gardens, the Gardener and Builder ought to go Hand in Hand, and to consult together ; because the Gardener has often Occasion, in the Course of his Works, to make Use of all the waste Stuff that the Mason or Brick-layer digs out of the Foundation of the House ; and 'tis a very great Fault, and likewise an Expence, when Persons (as 'tis the common Method) first, dig the Earth out of the Foundations, and throw it out in promiscuous Heaps, and after that have it to remove again,

to

to fill Cart, shoot down, and spread again, all which Works aggrandize the Expence of an Undertaking, when there is no Occasion for it, when at the same Time it is dug out of the Foundations, it might be carry'd away and shot down in the very Place where it is wanted, without any more to do. And to this End, the Gardeners Scheme ought to be laid at the same Time the Building is carrying on, and, in Truth, to be finish'd out of Hand, that it may be growing while the Edifice is carrying up.

I can't chuse but press again this Care of disposing of the Stuff as soon as it's dug out of the Foundation of the House; for People are generally in such a Hurry and Amaze, and Gardeners take so little Notice of this one Particular, that I have often seen these coarse heavy Materials tumbled backward and forward; and I dare aver, in a Design now carrying on, near 500*l.* has been thrown away in this one Article of tumbling their Earth backward and forward, when it might have been dispos'd in its proper Place at once; the Fellows all the while muddling on, as if they were amaz'd; as for Labourers, they care little for that, tho' some of them often see it; it should therefore be the peculiar Care of the Gentleman or his Gardener.

To return to our more immediate Rules in Practice. You are to chuse as high a Mold or Plan as you can, to fix your House on; and there, after the whole Design is cock-spitted

spitted out, (as will be taught more by-and-by) the Mason, or Brick-layer, is at the Center of the Garden-Front, to erect a Square Peer, or Base of rough Stone, (as the Base A, Fig. 1) on the Top of which he is to lay a smooth flat Free-stone Cap, and to make it exactly level, that by laying thereon a long Rule, you may at any Time turn it about, and take a general Survey of all your Levels. This Stone, with its Cap, should be just the Height of the Top of the Basement, being the Level of the grand Floor ; or, to speak more plainly, the Level of the Great Hall, Dining-Room, &c. and the Rooms that lye contiguous thereto.

This Base-Peer ought to be fix'd with Judgment, according to the Nature of the Ground, and the Height you intend the first and grand Floor should be ; which, generally speaking, ought to be 7 or 8 Foot above the natural Ground, allowing three Foot and an half for the Height of your grand Terrace, and four Foot, or four Foot and an half for the Height of your Basement above that grand Terrace ; which four Foot, or four Foot and an half, we suppose to make eight or nine Steps, for the Number of Steps going up from off the great Terrace, to the Level of the Hall-Floor.

This pitching the grand Floor so high, besides the Elevation it gives the House, is very convenient, in as much as thereby the Cellars are less damp and moist ; and where-ever Springs are apt to rise, it is attended with the
greatest

greatest Advantage imaginable. Besides which, the Expence of digging the Cellars, is considerably lessen'd ; only so low it ought to be fix'd, that the Cellars may afford Stuff enough therefrom, and from the main Foundations, to make the Terrace-Walks, and such like Eminences, that are projected, and which the Nature of your Ground absolutely requires.

And before I go any farther, I can't but recommend the carting out all this Earth or Clay, rather than wheeling, because one is a very great Charge more than the other ; I have observ'd, that one ought never to wheel above 15 or 20 Yards at most, except it be in some Cases, where there is not a good Supply of Stuff, or where six or eight Men can't stand to work, to keep the Carts always moving : In this Case, in order to forward the Work as much as possible, let one Cart always be standing, with two Horses ready harness'd, and another always going ; and this makes an incredible Dispatch, if you have six, eight, ten, or twelve Men always digging and filling, and three or four spreading and levelling it, as it is carry'd out into the Terrace-Walk, or other Hill.

The Terrace-Walk, or Mount, being already stak'd out, and Care taken that they do not lay the Earth or Clay, so taken out, too high, allowing always 8 or 10 Inches for good Mold, Turf, or Gravel, and in the finishing the Plan or Surface of this Walk.

Let

Let us come now more particularly to the Profile. The Pillar being fix'd, as before directed, we allow five Foot, or five Foot and an half, for the Height of the Basement above the Terrace, and three Foot, or three Foot and an half, for the Height of the Terrace above the grand Plan of the Lawn or Parterre, as appears by the Scheme ; we then allow an Inch, or an Inch and an half, in ten Foot Fall, for the Descent of that Place, or if the Ground be rising, less will serve ; but one would by no means allow less than a quarter of an Inch in ten Foot Fall ; altho' Sir *Jonas Moore*, and other Artists, in their Water-Levels, are, upon other Occasions, content with less.

The Length of the Parterre being then 500 Foot, we need not make the whole Fall (except oblig'd by the Descent of the Ground) less than three Foot and an half, or four Foot ; nor ought we to make it more than six Foot. And this last is what I have observ'd in the Profile.

If the grand Walk continue thro' a Wood, or on a Plain, it ought to be carry'd with the same Descent ; tho' after one is got 2 or 300 Yards Distance from the House, one may take the Liberty to swerve from it ; but it should be rather a rolling Level, than a strait stiff one, than which nothing looks more cramping and ridiculous, and is a Blemish in a great Design that might be nam'd. Where-ever, in that Case, the Ground falls off too quick, the
Level

Level ought to swim, as it were, over Hill and Dale; or if it be a strait Line, it ought to fall at once, by a Slope, with such Divisions to answer it as the Nature of the Place requires. This is to be seen at Letter D; and the rolling Level appears at Letters e e e. In this, nevertheless, the Walk ought to be a dead Level, cross-wise. To sum up all, the Fall from the Ground-Floor of the House (in this Profile) to the Extent of the Park-Wall, or of the grand Walk, as far as one would have it appear a Garden, is 24 Foot 6 Inches, which is a very proper Fall, and is thus accounted.

	F.	I.
The Basement —————	5	0
The Fall from the great Terrace	3	6
The Fall of the Parterre —————	6	0
The Fall at Letter D —————	3	6
The Fall of the rolling Level —	6	6
	<hr/>	
	24	6

Observations on Fig. 3, in the 3d Plate.

This Figure is put to demonstrate the Profile of a Parterre, cross-wise, with the Terrace-Walks on each Side; and is what in general is, or ought to be, near upon a flat or dead Level, since it is to answer the Length of the grand Terrace, the Level and Plinth of the House, &c. And this Scheme fully shews where it ought to be flat, and where convex; as
also

also the Width of the Terrace and other Walks, and the horizontal, perpendicular, and hypothenusal Lines thereof.

And this is supposing the Terrace be rais'd entirely of Earth, Clay, &c. brought from other Places; for where-ever it is cut out of whole Ground, it is in it self much the cheaper. But Terrace-Walks are so very useful, as well as beautiful, that one would by no means fail of having these Side-ones; since if there is not Stuff to spare out of the Foundations of a House, or if the House be already an old one, or built but some Time since, by sinking the Levels in the Parterre or Lawn, 'tis an easy Matter to procure Stuff enough for any Occasion, especially this; and we may add thereto the Nearness of its Movement, which is not a small Article.

When, therefore, in order to proceed regularly in the Conduct of our Garden, the Terrace is done, or stak'd out only, you are to go to the Parterre, and at the Head thereof you sink your Level three Foot and an half for the Fall of the Terrace, which, according to two Foot and an half horizontal to one Foot perpendicular in the Fall, you are to make the Base of your Slope eight Foot nine Inches horizontal. We do, in many Places, allow three Foot horizontal to one Foot perpendicular; but this there is not always Room for; but less than two we never ought, nor more than three we need not; but this I have mention'd elsewhere: For tho' there are some
that

that are indiscreet enough to make but one Foot and an half, nay, some not above one Foot, horizontal to the same Perpendicular, it must be a very great Fault; for if the Slope be deep, there is no standing to inow upon it; neither if the Ground is tolerably good, will the Grass prosper well, much less if it be hot, burning, gravelly Land; but for rolling, there is not Room for supposing any such Thing, which is what makes our Slopes the finest of any Ordering or Dressing we can bestow upon them, next to mowing.

And I must digress to observe, amongst those that have either by Practice or Writing inculcated this Error, in that Book of Mr. *James's*, in which, in his Directions for cutting of Terrace-Walks out of all Hills, he has, in several Slopes, not allow'd above one Foot horizontal to one Foot perpendicular; which must be very ill Advice, and I could not but caution the World against it.

But to re-assume our Practice in the staking out and levelling this Profile Line; fixing the Level at D, turn it long-ways of this Line, which will crop the Head of the Parterre; and fixing Stakes in at L, you have the Bottom of your Side-Terraces, from which, after you have measur'd out eight Foot nine Inches, the horizontal Line of the Slope, you may raise the Height three Foot six Inches, which being done on each Side, you may soon level the Tops of your Terrace-Walk, as also the Bottom-Lines of your Parterre.

M

Having

Having thus done, you are to fall your fix Foot ; but if your Ground does not require it, five or four Foot will be Fall enough, in respect to the Work it self. The Method how this is done, is sufficiently laid down in *Directions for using Garden-Instruments*, &c. (p. 60) After you have thus fix'd the Stake to its true Fall, at the lower End of the Parterre or Lawn, you are to repeat the same Work again as you did at the upper End, by twining the Level a-cross the Bottom of the Parterre; and having thus finish'd your Levels at the Bottom, as you did before at the Head thereof, you are sufficiently prepar'd with your main Stakes ; and these ought to be at least two Foot long, and drove down with Beetles and Sledges, with all the Force imaginable ; for that these Stakes, once mov'd, will always put your Work into Disorder, and make it unlevel ; and there are so many Accidents that do, that you can't be too careful in the avoiding it.

I think I have gone thro' the most material Parts both in the Design and Execution of the rough-levelling Terrace-Walks under the main Body of the House, in the Garden Side, as also the Side-Terraces of a Lawn or Parterre ; and it would be needless for me to repeat the Method of working, dressing, and carpetting them, in as much as it will fall in more properly in other Places.

Observa-

Observations on Fig. 4, Plate 26.

This fourth Figure properly relates to the Fencing of Gardens; which, as it has been of late done by a Terrace Walk in the Inside, and a Graff or Ditch in the Outside, may not be improperly transiently handled, tho' it be more fully in another Place.

As for the Method that has been us'd some Years since, in walling the Parterre with an high Wall, what can be more ridiculous, or expensive? It may be alledg'd, these Walls are for Fruit; but these Fruit-Gardens ought to be detach'd from the House, separate and private; since by this Means no Body dare walk but the Owner himself, for Fear of losing his Fruit; and that would be an Inconvenience but few generous Tempers would create, especially in the Country, where Extent is requir'd. But, to resume the Observation.

This, without Doubt, is the noblest Way of fencing in a Garden (next to Water, which can't always be had) but I have given Profiles of both, a Wall and Water; which, when well understood, will, I doubt not, be much more put in Practice than have yet been, since upon these Terraces it is that one may look either forward or backward, and view with Pleasure the rude and distant Scenes of Nature, as well as the more elaborate Works of Art.

The Ditch, or Graff, on the Outside, being what supplies the Inside, and raises up the Terrace, was certainly a very good Thought, tho' I presume it has not been much practis'd by us in *England*, and was first deliver'd to us by a Gentleman, that is deservedly honour'd with some considerable Posts belonging to the Architectural Province, &c. in his Majesty's Works.

This Outside, from which we are supply'd with Earth to raise the Terrace-Walk in the Inside, is by the *French* call'd *la Fossé*, from the *Latin*, *Fossa*, a Pit; by the *Dutch*, *Graff*, and from them the same by us; and ought to be about 15 Foot wide at Bottom, five Foot deep, and the Slope 15 Foot horizontal, which is the Proportion allowable to sloping, as before directed.

The Wall is seven Foot and an half high, from the Top to the Bottom of the Graff, which is five Foot below the Plinth of the Terrace in the Inside; and two Foot and an half the Height of the Parapet-Wall, which is about Seat-high within, and gives one the Liberty of all the Beauty that Nature affords without. The Width of the Terrace may be about 12 or 15 Foot more; and wider than 20 Foot it need never be in the greatest Designs. The Profile points every Particular out so very plain, that I need not take any more Pains inwards.

Observe-

Observation on Fig. 5, Plate 26.

This last Figure in this Plate is the Method of making a Terrace-Walk at the End of a Garden, or round the same, where Water can be had, and for fencing the Garden, Wilderness, &c.

And this is certainly the beautifullest of all Fences; and by digging the Canal, or Water-course, you throw up the Earth that makes the Fence. But this Terrace ought not to be too high; two Foot nine Inches, or three Foot, is full high enough, and two Foot and an half will do; but this should likewise be detach'd from the End of all Walks, that the View may not be stopp'd into the Grounds adjacent; and this is also the Reason I would advise them not to be made too high.

Observation on Fig. 6, Plate 26.

The last we observe in this Plate, is the Plan of the grand Terrace we have already given the Profile of. It is (as is already observ'd) near 100 Foot wide; by which means the Building may be view'd with Ease and Pleasure; and has, besides, something in it self that looks grand.

For the Steps and Half-Pace coming out of the House, project 15 Foot, 12 Foot whereof are allow'd for Gravel next the House, and three Foot the Width of half the Verge of Grass,

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the Lines of Trees, on the Terrace, ranging in Line with the Pedestals at the Bottom of the Steps, which makes the Verge of Grass, when it is at full Length, to be six Foot. This and the other Part of the Terrace is divided as follows :

Ten Foot Gravel next the House, or Cockle-Shells.

Six Foot a Verge of Grass:

Ten Foot, a Counter-Gravel-Walk, or Cockle-Shells.

Six Foot, another Verge of Grass.

Three Foot of Sand, or Cockle Shells, between the Grass and the Paving.

Forty five Foot, the Paving.

Three Foot of Sand, or Cockle-Shells, between the Paving and the Grass.

Six Foot Grass.

Ten Foot Gravel, or Cockle-Shells.

Six Foot Grass.

Then comes the Slope.

Whether the Verges of Grass before the House be left plain, or planted with Pyramid Yews and Vasa's between them, I leave to the Discretion of the Owner. I must confess there's a becoming Decency and Grandeur in plain Grass only; and of that Kind is the large Terrace in *Busby* Park, belonging to the Right Honourable the late Earl of *Hallifax*, and seems much more proper in a Forest than elsewhere.

I have recommended Paving for the Middle Walk of this grand Terrace, it being very noble in its Kind; and, besides, there are Times (especially wet Weather) when Gravel-Walks are not fit to walk upon: In this Case Pavement is of mighty Advantage; but I only mention this *en passant*.

The Side-Walks are of fine Gravel; then three Foot next the Paving of Cockle-Shells; the Fall into the Parterre is, next, which, to avoid Expence, I would rather advise to be a Slope of Grass, than a Wall, in the Middle of these Grass Verges, except it be in the very Front of the House. Let us suppose Elm-Trees for Shade, since the noblest Terrace, as well as any other Part of a Garden, is very deficient without it. And at the End, except the View be open and noble, one would advise a little Grove, with shady Arbours and Recesses, at the End of which, on a Seat plac'd, the Owner may view the Grandeur of his Terrace, and have an oblique View likewise of two Fronts of his Building; but if it be an open View (which is seldom to be had at both Ends) then a Canal, Cascade, or the Continuance of these Lines, will be a noble Termination. These shady Elms I very much recommend, plac'd and detach'd (as they are design'd) from the Body and Wings of the Edifice. And the Want of this seems to me to be some Disconut to the Beauty, as well as the Convenience of that noble Terrace I have, in the Series of this Chapter mention'd. Surely

no Seat can be said to be compleat, where there is not an immediate Shade, almost as soon as out of the House. And the same may be said of all other Side-Terracès, which ought by all Means to be planted with good Oak, or, which is of quicker and more regular Growth, Elm, rather than the more costly Yew and Holly, that must always be clipping, &c. besides the other are, in Reality, of more Value, beside the noble Umbrage that they afford the Owner. The Distance of these Elms a-cross will be about 20 Foot, and they may be plac'd at 30 Foot asunder in the Lines; the Quickness of their Growth, will, 'tis hop'd, soon gain Shade and Shelter to the weary'd and studious.

Amongst all that can be said of the Beautifulnes and Nobleness of Terrace-Walks, those that are cut out of a natural Hill very much exceed all others, plac'd upon which we view the adjacent Country with the utmost Delight, and the Spirits are by an unaccountable Delight rais'd to the highest Pitch that Nature and sublunary Prospects can possibly advance them: For who is there that ever saw those noble Elevations of *Belvoir*, *Nottingham*, *Burleigh on the Hill*, *Winchester*, and many other Places, would not think them appointed by Nature for the Residence of great and sublime Spirits, and for the royal and most noble Personages of the World,

But

But, to quit this exalted Thought for a while, let us consider the best Method of cutting and dressing any Hill into Slopes. I have, I think, already, in the first Part of this Treatise, mention'd something of the Calculations that every Surveyor ought to make in the dressing and removing of unlevel Ground; and in this Chapter it will be more fully handled. Which that we may better do, we must have an immediate Recourse to the rough View of the natural Hill, in *Fig. 1, Plate 27*, and to the Scheme of the same Hill cut into Slopes, in *Fig. 2 of the same Plate*.

Observations on Fig. 1 and 2, Plate 27.

When you first begin dressing of a Hill, you ought by all means to take its Level from the Top to the Bottom (as will be more plainly shewn, when we come to take in the Level of Spring-Heads) and to draw on Paper the Hill, with its Bunches and Excrescencies; since 'tis by this that you must first conduct your self in the dividing it into Terraces; otherwise you may put the Owner to an immense unnecessary Charge, since it is not requir'd, that those Terraces that lye under one another, be of an equal Height or Width, but they should be govern'd and determin'd by the natural Line of the Hill.

In this Example I find the Perpendicular of the Hill is 49 Foot, and the Horizontal from the Perpendicular of the very Precipice of the Hill,

Hill, at A, at the Top, or, more properly, at the Bottom of the Perpendicular, at A to B, is 182 Foot.

Now, in order to take a general View of it in Numbers, we must examine what Proportion the Height of the Hill bears with the horizontal Base, since 'tis this that must determine whether you are to divide your Hills by Walls or by Slopes, or, which is a middle Way, by Walls and Slopes mix'd, *viz.* one Wall and Terrace, with a Slope between that Wall and the next, as you may see in Figure the 9th, Plate the 27th. In order then to establish what I am going to lay down for our Direction in this Case, we ought never to make the Perpendicular of our Slopes above 15 Foot in the highest and most steep Hill; and the Base to that Perpendicular ought by no means to be less than twice the Perpendicular, &c. It will therefore follow from thence, that where-ever the Horizontal of a Hill be not above twice the Perpendicular, that there the Hill must of Necessity be supported by Terrace-Walls, or Terrace-Walls and Slopes mix'd together; but where it is more, that it may be done by Slopes, or by a Wall and Slope, as has been already mention'd.

To put what we have been advancing into Practice, the Perpendicular of the Hill being 49 Foot, multiply this 49 by 2, and the Product is 98 Foot; and so much is requir'd for the Horizontal of all these Slopes. This

98 you must then subtract from the whole Horizontal of the Hill, which, as appears before, is 182 Foot.

See the Example.

49 the Perpendicular of the Hill,
 multip. by 2 the allow'd Rule for the Base of
 ——— a Slope,
 makes 98 as above :

182 The whole Horizontal of the Hill,
 98 as above, being subtract. from it,

leaves 84 for the Flats of all your Terraces,

which divided by 3.) 84 (allows the Terrace to be 28 Foot wide, which is a very good Width; and from this Examen we find this Hill may be divided by Slopes, without a Wall; which is much cheaper, and, in Truth, more beautiful; but this Point I shall speak to more by and by.

After this preliminary Examination is over, we are to proceed in dividing the Hill into Slopes and Terrace-Walks; and, for the Advantage of the Work, we must cut three or four, and sometimes five, Foot, into the Hill, at the Top; because it gives some Advantage to the Hill it self, and the Earth is easily tumbled down to the Foot thereof, or to make good any Deficiency in the Middle or other Parts. This will readily inform us, that both in the designing and executing of this Work,
 we

we ought to begin at the Top first, and so work downward; for this Reason, that the Earth is very easily tumbled down; on the contrary, one can't throw it upwards but with the greatest Difficulty.

To go on then in our Work (which is something difficult) you are to find whereabouts your hypothenuſal Line $a\ b$ falls; which hypothenuſal Line being 35 Foot, you are to divide by 5, and multiply it by 2, and that gives you the Perpendicular of this Slope, and conſequently the Horizontal. See the ſame illuſtrated by Example.

The Length of the hypothenuſal Line, which the Gardener ought to have upon a Line, and to fix it diſcreetly in, ſo as to humour the Nature of the Hill, (and the ſame does by Compaſſes on the Paper) being 35 Foot. do as underneath, *viz.* divide by 5, as has been already taught;

$$5 \overline{)35} 7$$

the Quotient being 7, multiply it by 2, and that gives 14, which is the Perpendicular of the Slope, equal to 35, the given Hypothenuſe; and this, by Conſequence, makes the Horizontal to be 28 Foot, according to the leaſt Proportion we allow of the Horizontal to the Perpendicular of a Slope.

To do this upon the Ground, fix a dead Level at a , Fig. 2, Plate 4, as $a\ c$, which we ſuppoſe to be two Stakes, upon which we
place

place our Boning Staves, before describ'd, about four Foot and an half long; and at the End of the hypothenusal Line, at B b, set up a 20 Foot Rod, and place it exactly upright, by holding a Mason's Plumb-Rule to the Side thereof; and as you have already found, that your Perpendicular must be 14 Foot, you are therefore to tie a Piece of white Paper on your twenty-Foot Rod, at the Measure of 18 Foot and an half, (by which you allow 4 Foot and an half for the Length of your Boning Staff) and when the Paper is level with the Heads of your two Boning Staves, you may then conclude you are right; but you must observe one Thing, *viz.* when you apply your Hypothenusal a b to your twenty-Foot Rod, and find you are to sink two or three Foot deep into the Ground, you must be sure to make an Allowance, else you will overrun your Hypothenusal or Slope Line.

This Point being determin'd, it will be very easy to measure out, according to the Nature of your Hill, the Width of the next Flat, which, in my Design, is 37 Foot; from the Extremity of which you are to repeat the same Process as you did in the other Slope, having in this Flat made a small Allowance for the Hang of it, in order to the carrying off the Water, which Hang may be about an Inch in 10 Foot, or something more; so that in this it may be about four Inches; and if it were 6 or 8, it would still be the better, and would in some small Measure help to take the
great

great Depth of the Slopes; but this should be carefully deducted out of every Perpendicular. For Instance, the Perpendiculars of the next Slope being 12 Foot, you ought to deduct these 6 Inches, (if you allow so much) and make it but 11 Foot 6 Inches, still allowing 24 Foot for the Base of it; otherwise your Measures will not hit together at last.

The middle Line of Stakes, from Top to Bottom, being fix'd, we come now to the general Plan, and to the Care and Art that there is requir'd in staking it out.

Observation on Fig. 3, Plate 27.

It appears, by the Scheme, to be an Imitation of Fortification, in which there seems to be little Occasion to follow the exact Rules thereof, but to use it chiefly so, as that it may the most conduce to the Beauty and natural Form of the Hill. I need say little as to the reducing Fortification into Gardening; 'tis what will, I believe, be very pleasing to all the martial Genius's of our Country; and it seems somewhat of Wonder, that it has not been made Use of before now. The first that was made Use of, of this Kind, was the *Ambit* of the Gardens at *Blenheim*; but that is after the ancient *Roman* Manner: I shall not, in this Place, insist much thereon, leaving it 'til I come to the *Fencing in of Gardens*, where this Way of Fortification will come in very opportunely, and, I doubt not, be very agreeable

able to all such as love Improvements in Arts and Sciences.

At present let us observe, that a Hill thus regularly cut out, makes a kind of natural Perspective from the very Lines of the Plan: And, indeed, there is no Figure in all the Mathematicks, that suits the natural Beauty of an Hill so well, especially when it is a round one; but were it to be a Hill in Length, one would certainly, by cutting an Hollow in the Middle, make those Bastions at each Angle of an House, or any other Plan, at the Top of an Hill; for there seems to be something of a pleasing Air in the Breaking forward of those Angles, such, indeed, as few or no Geometrical Figures will allow of, because they splay off, according to the Rules of Fortification.

'Tis true, the Curtain or Flank Line, between the two Angles of the Hill or the Bastions, is longer than is allow'd in Fortification; but that is not much to our Purpose. The Breaks of the Angles (be their Distance what they will) the Exactness of the Slopes, as they lye one under another, and the general View of all is what, in this Case, is more to be preferr'd, than any exact Rules in the military Science, since 'tis not Use but Beauty that we strive here for.

Our Design being thus fix'd and resolv'd upon as to the Plan, and the middle Line being divided, as is before directed, you are to turn your Level length-ways of the Hill, at right
Angles,

Angles; or, if it will suit with the Nature of the Hill the better, you may deviate from the great Exactitude of a right Angle, and may vary 6, 8, or 10 Degrees, without any Body's perceiving it. The chief Care should be in the first fixing of the Edifice, or any other material Line above the Hill, since these lower Slopes and Terraces ought by all Means to run parallel thereto, in Respect to Line as well as Level. And this is a great Fault, that is easily discernible in the Slopes of a noble Situation in the North Part of *England*, where the Slopes run neither parallel to the Line, nor are they parallel as to the Level of the Plinth, or, indeed, any of the Building; which makes them look twisted, awry, and not so agreeable as they would otherwise be.

To finish what we have begun, whether we fix our Slopes at right Angles, or whether we deviate either on the right or left, six, eight, or ten Degrees from the Rules already laid down, of carrying a dead Level a-cross the Head of a Garden, Terrace-Walks, &c. fix in Stakes at all the Angles of the Bastions; and being level, according to former Directions, there seems to remain nothing to do, but to proceed to working these Slopes, the Method of which will appear in the next several Figures.

Observa-

Observations on Fig. 5, 6, 7, in Plate 27.

You are to fix in the Stakes between the Angles of the Bastions (first] having the Stakes drove down very firm, so that no common Accident may move them out of their Places, or sink them below, or raise them above, their Level) betwixt the first middle Line of Stakes and those Angles, about 30 Foot asunder, you are to put in Stakes for the forming your Slope, as in Fig. 7, Plate 27. Which Stakes being levell'd in, as is seen in the 5th Figure, you are to strain the Line, as in the 7th, Diagonal-ways; thirty Foot is, indeed, full long to strain a Line, but the Stake ought to be well fix'd in, and then, by a Twist, you may strain the Line as tight as you will, the Line being made of the strongest small Cord, or large Twist; or, otherwise, you may set the Stakes in, at 15 Foot asunder; but this is to describe the Method in general.

You are to begin (as is before directed) at the Top of your Work, and are to cut the first Slope quite out of whole Ground, that the superfluous Ground, that is par'd off, may be tumbled down, to make good any Deficiency that is underneath.

*Multorum Manibus grande levatur Opus,
That Work grows light that many Hands employs.*

is, in this Case, a very good Rule: For the Hill being all stak'd out, as fast as a Bump is
N taken

taken off from one Place, 'tis receiv'd by Persons working in some Hollow near them, where they are at the same Time employing themselves in filling up and ramming those Hollows. And, indeed, the setting a great many Hands at Work together, is of great Use in this and most other Works.

In these Figures are therefore contain'd our *English* Method of levelling an Hill into Terrace-Walks and Slopes; how the same is to be particularly levell'd and lin'd out, and how the Stuff is to be mov'd, and where plac'd: By which Time we may suppose our Hill is brought to what we call a rough Level; let us now proceed to shew how they are to receive their finishing Stroke, how they are to be planted, &c.

The Hill being, as is before suppos'd, brought almost to a Level, the Workmen begin to strain their Line anew, and to take the Rake in Hand, in order to make good their Diagonal Lines; and that being done, the Quarters betwixt them, as are the Quarters a b c d e f, &c. the Work will begin to appear: And that the Lines may be the neater made out, in the carrying on this Work there ought to be a Reserve of the top and best Mold, to coat the Slopes with, and such reserv'd for the finishing, as will rake fine, either for the laying of Turf, or Sowing, which will come to be spoke of by-and-by.

I think the Method of levelling in the Stakes, straining the Lines, Raking, and Dressing,

Dressing, is, by what has been writ, and by the Figure on Plate the 27th, sufficiently treated of. It now remains, that we speak of Turfing, or sowing with Hay; the latter will, by all, be allow'd to be the cheapest, tho' the first be the finest, and most immediately finish'd and in its Perfection.

But in large rural Designs, which is what the Subject of this Book is, and, to save Expence, I very much advise sowing with Hay-Seed; except you have some Up-land-Turf that you can fleece off, that lies near at Hand, on any Common, or enclos'd Ground, that is intended to be plow'd; for by this you save a prodigious deal in Carriage.

1000 of Turf has formerly cost 10 Shillings racing, cutting, and rolling; (every Turf being three Foot long, one Foot wide, and two Inches thick) but they are now cut cheaper; and I have computed, that the cutting and laying of a Rod of Turf, sixteen Foot and an half Square, will cost near 10*d.* by which any Gentleman may easily reckon up his Charge, when he knows the Dimensions of his Work.

Certainly, for about that Money, or far from *London*, at a cheaper Rate, 'tis possible for a Gentleman both to rake and turf his Terrace-Walks and Slopes; which amounts to about 6 or 7 *l. per Acre*, and which is no great Expence, and would encourage him however to turf all those Parts that he is in

most Haste of seeing in Perfection, and sowing those that lye farthest out of Sight.

The Sum of all, as to the Expence, is 2 s. or 2 s. 6 d. *per Rod*, at which Rate any Gentleman may level these Works, and rake and turf them, provided he goes not above one Foot deep in the excrescential Parts of it, or does not raise it above one Foot deep in the Hollows, that is to say, in plain Terms, that can by his Care and Judgment so manage it, that what he takes off at one Place, may make good another, and not more; which requires some Judgment and Care in calculating, and is, indeed, a Province that very few arrive to any Proficiency in, without a considerable deal of Experience. 'Tis in this respect that many Gardeners run their Masters to an infinite Expence to no Purpose, and make them pay soundly for the Neglect of good Advice.

All that I have to add more on this Matter, is, that I have made both the Steps and the Lines of high Trees, that stand upon the Tops of the Slopes, to splay off which I take to be absolutely necessary in Works of this Kind, which by the Diminution of the visual Rays are apt to contract the Vista too much; and I shall finish this Chapter by advising, that whenever your Slopes be of a hot burning Gravel, or Sand, you carefully preserve all your good Mold to line your Slopes with, to keep them from burning in the Summer-Time; and, if possible, you should
procure

procure some cool strong Land, with which you may cover them three or four Inches, to great Advantage; but the first is easily procur'd.

Observation on Fig. 9, Plate 27.

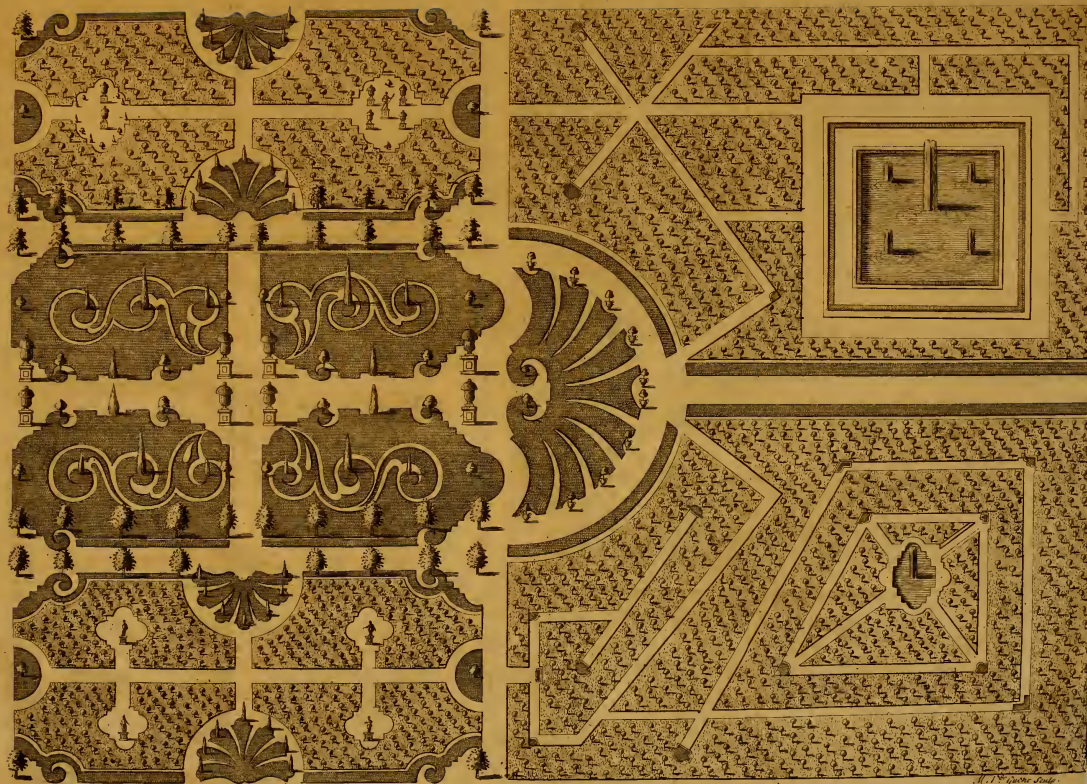
Figure the 9th contains the same Hill cut out into Terrace-Walks supported by Walls; and this truly looks very noble, but it is withal very expensive, and is not so rural as Slopes of Grass are.


I know there are several Persons fond of it, on the Account of the Walls for Fruit; but Experience shews, that the Trees being expos'd to the Bleakness of the Winds, (as of course they must in such high Situations) are very much damag'd thereby. And to this we may add, that if the Ground be wet and cold, the Water soaks thro' the Wall upon the Roots of the Trees, and almost destroys them, and this especially in Peach-Trees. This is of so ill a Consequence, that I believe no Body, when they are appriz'd of it, will be fond of making those Walls on the Account of Fruit, when it may be likewise objected that half a Wall is thereby lost, since were the Owner to build Walls on level Ground, he may, in most Cases, plant both Sides. And the Truth of the Matter is, the Trees that stand against those Terrace-Walks, (especially the Peach Trees) are most miserably maul'd every Spring, at the Seat of a

Right Honourable Lord that I have had Occasion to mention already, notwithstanding all the Care imaginable has been taken to prevent it.

I need say little to demonstrate the Scheme, it is very plain in it self; but if any Gentleman does proceed this Way, he ought to have Pieces of Timber, with S's at the End, laid into the Terrace, to tye the Wall tight; tho' in large Stone it may do without. And that the Wall it self may butterise inward, in order to discharge the Weight the better, I would rather advise, that rough Stone or Brick, at the Back-side, be laid in Mortar, than dry; since one Way draws the Wet to the Face of the Wall, which the other in some Measure prevents.







CHAP. VI.

OF THE

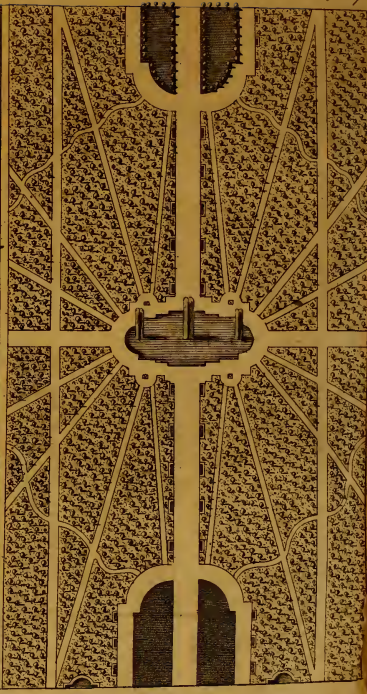
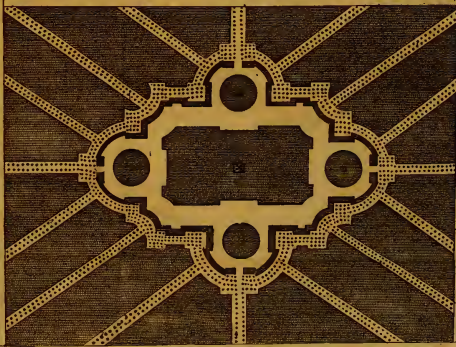
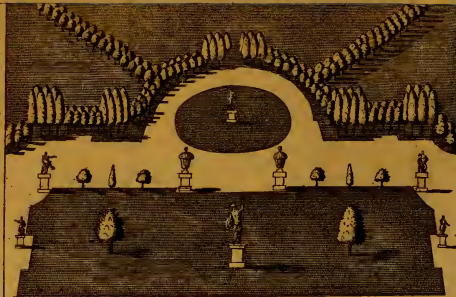
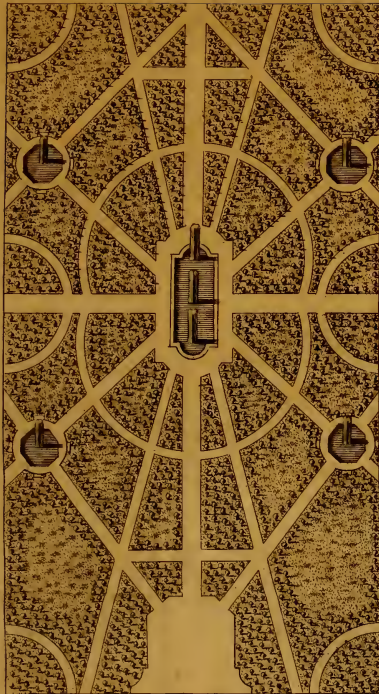
PARTERRE.

Parterre (says the Author of *The Theory and Practice of Gardening*, as he has it from the *Royal Dictionary*) is deriv'd from the *Latin* Word *partiri*.

I shall not absolutely determine against so great Authority ; but it seems to have a nearer Relation to *Pars*, or rather the *Latin* Compound, *par* and *Terra*, a level, even Piece of Land ; neither does it seem to imply any particular Decoration or Embellishment with which it is furnish'd, and is therefore, by Mistake, suppos'd purely to imply, in a limited Sense only, that Division or Plat of Ground, which with us (as well as in other Countries where Gardening is in Esteem) is call'd the *Parterre*, or *Flower-Garden* ; since the *French* have their *Parterre d' Eau*, or *Par-*

Of the Breadth.

Parterres generally receive their Width from the Breadth of the Front of an House; and where-ever the House is above 200 Foot wide, we are oblig'd to follow it; but if the House be not above an hundred Foot, or, sometimes, less, it would be too narrow for a Parterre; and for that Reason an exact Measure ought, in this respect, to be fix'd; every Person is at Liberty to chuse for himself; but, according to the Observations I have made on this Subject, Parterres are, generally speaking, too large, by which Means the Expence of Gardening is not a little rais'd, and that which is the most valuable of any Part of a Garden, I mean Wood, and, consequently, Shade, very much diminish'd. As one would therefore never make the Flat of a Parterre, betwixt Terrace-Walk and Terrace-Walk (which ought to be made on each Side, for an Elevation proper for View) above 300 Foot, or 100 Yards, so one can't, by any Means, make it less than 140 or 150 Foot; by which Means the Length, at two times and an half the Width, will be 350 Foot, or something more, which is certainly a very handsome Proportion. I have been the more particular as to this Length of a Parterre, in as much as it is very often a Mistake in Designers, to make their Parterre too wide, and, consequently, they appear too short; and in
this



this Respect I think many of the *French* Designs (especially those that are in Mr. *James's* Book) are very blameable; for, as nothing is more pleasing to the Eye than a contracted regular Conduct and View, as soon as one goes out of an House or Building; and a forward direct View (as has been already hinted at) is the best, be it either Parterre, Lawn, or any other open Space (double, treble, nay sometimes, quadruple the Width) why may we not justly blame those Designs that are much wider than they are long, and where, at our immediate Entrance into the Garden, the Nobleness of View is spoil'd, the Angles of Sight broke and confus'd, and, in short, all that is valuable in Opticks made of no Account. Let this then suffice for a general Examen of the Proportion of Parterres; come we now to the Plates themselves.

An Explanation of Plate the 28th.

The first Plate contains a Design that was a long Time since compos'd for a private Gentleman; but neither that nor any other Design is yet there perform'd; for which Reason I have given it without any Alteration. The Parterre is design'd for Grass, Gravel, and Sand, or Cockle-shells interwoven one with another, and is (unless it was to be entirely plain) the neatest and cheapest Way of making Parterres; besides, it is always green, and Winter and Summer it maintains its natural

ral Verdure; the Expence of keeping is still less than when there are Borders and Edgings mix'd therewith.

The Length is about 360 Foot, and the Breadth 180, which, indeed, is rather the shortest, but is what we were oblig'd to, thro' Fear of cutting away too much of the Wood that fronts the End of the Sweep.

As for the Wood, or Wilderiness, I have but little to remark, only that Care be taken to avoid an Error too much run into by many Designers of Gardens, in making the two opposite Sides directly alike. This is, in Truth, the having only half a Garden; since wherever the Sides are equally the same, when one has seen and enjoy'd the one half, there is little Occasion to view the same over again; but this proceeds from the Delusiveness of a regular Draught on Paper. The large square Basin of Water was almost ready by Nature, it would therefore (in order to have made both Sides alike) have been the greatest of Follies, to have been at the Expence of filling it up, since it is likewise in it self the greatest of natural Beauties and Conveniencies.

'Tis true, I can't agree with some, that would have, even in the Parterre, irregular and different Sides likewise; and I dare venture to lay it down as an Axiom in Gardening, *that whatever lies open to View, ought to be regular, while, nevertheless, whatever is within the Ambit of Wood, the more irregular, the more entertaining and diverting it is.*

The

The opposite Division is of another Kind, and intended for a Kind of Labyrinth, something of the Nature of that of *Verseilles* ; yet by no Means like some others, that are made of single Hedges ; for those seem to be calculated for an inferior Class of People. These are the most beautiful and most retir'd of all, and contrary to the Fashion very common amongst us of making their Wilderness open to all publick View ; and to such a Degree has this Fault been us'd, that in many Gardens of Note, 'tis hard to find (tho' the greatest and most essential Requisite in any Garden) so much as one private Walk ; but the Owner, upon all Occasions, is liable to the Noise and Impertinence of almost every Body. It is very proper that such Divisions as these should be enclos'd, and a Pallisado-Gate fix'd at D, to keep it the more private.

At the End, and in the direct View of every Walk, fix'd in the Espalier Hedge, are design'd Statues, Urns, Paintings in Stone-Colour, Grottesque and antique Figures, Tables, &c. In fine, this, which by Measure amounts to no more than four Acres and an half (besides the Kitchen Garden) is all that by any Means a Gentleman of considerable Fortune (tho' I shall not intend to limit any Body) would in Prudence make the interior Part of his Garden. The exterior, and more publick, will follow in a few Pages ; and 'till then I reserve what I have more to say on that Subject.

An Explanation of Plate the 29th.

I had once made a Resolution not to have given any Designs of this Kind in Gardening, intending to have confin'd my self to that simple, plain, and unaffected Method I have propos'd to my self in the Delivery of what I have to say concerning Gardening; but as the Opinions, and, indeed, the more solid Judgments of Persons, differ very much as to Design, I have (as before intimated) in Compliance with the Expectations of some curious Artists in this Way, given one Plate of that Kind.

And first, of Figures the 1st and 3d.

As to these first and third Figures, they are certainly the most eligible, by Reason of their Length, which, as I have before observ'd, is what is most valuable in a Parterre, something near those Schemes in the Parterre at *Hampton-Court*, next the Water-side; as is also that of *Blenheim*, and some others, that are accounted amongst the best of their Kind; but in order to give them their full Length, 'tis necessary, at the Ends of those Quarters, to add a Sweep or Break, to carry the Parterre to its proper Length; these Quarters ought likewise to be full 80 Foot wide, and of a proportionable Length, otherwise the Work in the Inside would be much too thick.

Whether

A Parterre in Shell work & Grafs.



A large Parterre Quarter, with a Fountain in the middle, and the Quarters of Grafs & Shell work.



A new Design for a Parterre.



Whether these Quarters are set off with Lead or Stone, Urns and Statues, or with Greens, as has been the prevailing Method; or whether the Borders should be of Grass or Earth, is left to the Choice of the Master; and to this Plate I need say but little more.

The 2d Figure, being entirely *Dutch* and *French*, I leave to the Choice and Refusal of all Designers.

Observation on Plate 30.

I have already mention'd (and both the Books, and other Accounts we have from *France*, shew) that the *French* have their Parterres of Water, as well as Grass and Embroidery; and it is, in Truth, some of the beautifullest Furnitures of the best Parterres.

This plain Design I drew some Years since, for a Gentleman that had a sloping Piece of Ground, that lay Side-ways of his House, which Slope is apt to spoil the direct View from any Building, and ought not to be admitted, especially in any main Front; for which Reason I thought it incumbent on me, to find out some Method to regulate this great Defect in Nature; and to that End, having a great Command of Water, I design'd this *Parterre d' Eau*, as the *French* term it; by which Invention the digging of the Basins would have plentifully supply'd the Terraces on the lower Side, and have made an handsome regular

can't possibly be put in any the least Competition with it. But if any are so curious, there is now at *Brumpton Park*, a very great Stock of tall standard Yews, that will retain their Leaves all Winter, and are, indeed, an immediate and beautiful Shade.

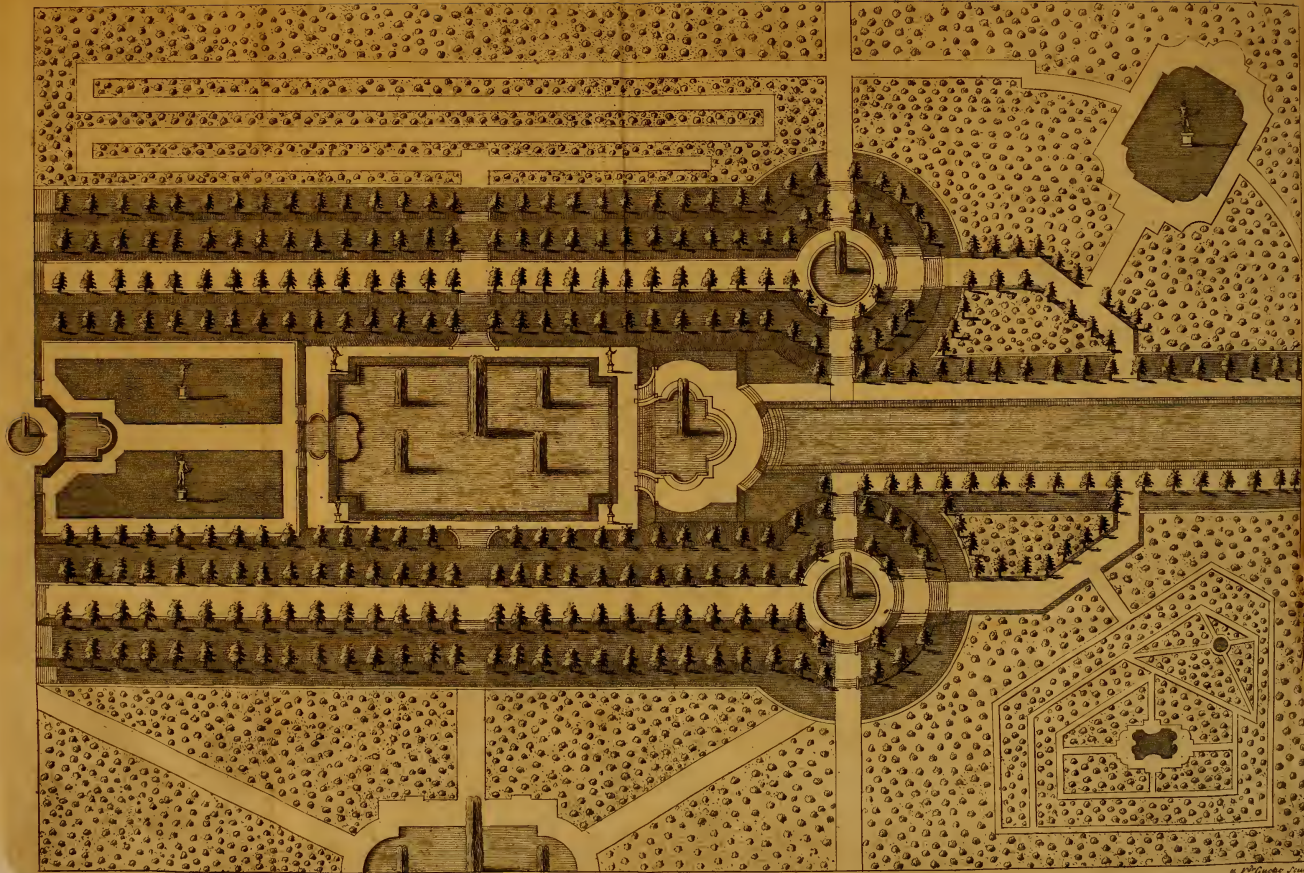
This cutting their tall Pyramid Yews into Statues, seems to have been one of the best Thoughts that has fall'n in the Way of Gardening for some Years. The noble Verdure and Shade that those Yews make, can't but recommend them to the Choice of this, as well as the Umbrage of the latest Age.

As for the Wood on each Side, it is not very pertinent in this Place (being upon Parterres) to say much of it : The upper Side is cut into long private Walks, which, altho' they have not that Beauty upon Paper, that Figures in Wood have, are yet much more retir'd and private ; the Want of which I take to be a very great Fault in most of our *English* Gardens; but this is already touch'd upon, and will more abundantly in the Sequel of this Book.

At the farther End is a large, open, rising Lawn, and thereon a Statue, which will have no mean Effect, in respect to its being a rising Hill, which ought to be plac'd amongst the greatest Beauties in Nature.

The opposite Division, on the lower Side, is cut out into little narrow Walks, after a Labyrinth Manner.





In fine, 'tis an easy cheap Design; and, considering the Beauty of the Terraces lying one above another, and the View, not only from the House, but also at the Bottom of the Canal the House it self, and all the Cascades of Water that fall from it, it may, I humbly presume, be reckon'd amongst the second or third Rate Designs; which was the utmost of my Aim in composing it.

The Terrace-Walk at Letter A, is to be supported by a Wall, or the Earth may be batter'd away (as we call it) down into the natural Slope of the Hill, which will save that Expence; and with this I finish what I have to say as to Parterres.

Here follows the Design.





CHAP. VII.

Of Woods, Groves, Wildernesses, Parks, &c.



INTRODUCTION.



THE greatest of all the natural Embellishments of our Country-Seats, being in Woods and Groves judiciously contriv'd and cut out, I shall make it my Endeavour, in this Chapter, to explain it, as much as in me lies: For, in Truth, amongst all the Errors committed in Gardening, there is none greater than in this.

Tho' since all that pretend to Judgment in Gardening agree, that Variety is the greatest and most distinguishing Characteristick in any Country-Seat or Garden, one would think it

no

no very hard Matter, to fix upon one and the same Method in designing of this beautiful Part of our Business: But I know not how it comes to pass, People do differ, and that very much; and one seldom hears of two Persons whose Opinions jump together in any Design, one will find Fault with what another esteems excellent in its Kind.

I think it proper, in this Place, if it were possible, to endeavour to reconcile the different Opinions of Persons in Gardening, and especially as to Woods, the beautifullest Part of it. And the best and most general Rules that (in Words) I can possibly lay down, are to endeavour to follow and improve the Advantages of Nature, and not to strain her beyond her due Bounds.

Some there are that esteem nothing well in a Design, but long, large, wide, regular Ridings and Walks; and this, in Truth, is right in an open Park or Forest, where the Owner rides and hunts: But that a Garden-Design for walking in only, or if thereto we add Magnificence, which, I must own, those long Ridings have, yet it would be a Fault to set too great a Value upon them in a Garden; and for the sake of long level Walks, to level all those little Eminencies and pleasing Labyrinths of Nature: For tho' a few of these Walks are absolutely necessary, in Respect to the Grandeur and general Beauty of a Situation, as the Middle and Side Walk, and a very few Diagonals, yet it is an unpardonable

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Fault,

Fault, as we see it almost every where, (let the Expence be what it will) to have scarce any Thing in a whole Design, but carries open Walks; so that be the Garden 40, 50, or 60 Acres, one shall scarce find any private or natural Turn in the whole; if the Wood be grown, down come all the noble Trees that stand in the Way of this Scheme. And this seems to be the greatest Difference in the Opinion of Persons as to Design. And that this is not Fiction, there are a great many Places do testify, particularly that beautiful Wood belonging to the Earl of *Carlisle*, at *Castle-Howard*, where Mr. *London* design'd a Star, which would have spoil'd the Wood; but that his Lordship's superlative Genius prevented it, and to the great Advancement of the Design, has given it that Labyrinth diverting Model we now see it; and it is, at this Time, a Proverb at that Place, *York against London*, in Allusion to the Design of a *Londoner*, and Mr. *London* the Designer.

But, to apply it more plainly to the Purpose in Hand, when you find a Wood that has a great many Hills and Dales, and is almost all of it compos'd of Irregularities, 'tis there one should not strain either the Fancy or the Purse, but follow those little Shelvings and natural Turns and Meanders. 'Tis there you should be regular in your Design; but whether the Level be up Hill or down Hill, whether the Turnings quick or more slow;
or

or whether the Wood it self be thick or thin, one ought always to take the Advantage of it, and to make it most agreeable to the Nature of it, having always a particular Regard to large old Oaks, Beech, and such like Trees; in which Case one would as soon fire one's House, as cut them down, since 'tis the Works of so many Years, I may say Ages, to rear them again.

On the contrary, how common is it for Layers out of Gardens to resolve upon some regular Scheme in the Closet, and from it to cut out their whole Design; so that down go all the Oaks, Beeches, &c. that have been some Ages coming to Perfection. And this, indeed, I foresee will be the Objection that will be made to some Designs that I have given; but I shall here explain when such Designs are proper to be us'd, and when not; so that I hope thereby to caution my Reader from falling into an Error on that Account.

When, therefore, we meet with a large Wood in an open Park, not near, or on the wrong (the North) Side of the House, and the same be a Level, particularly if the Wood be thick, and it does not destroy the general Prospect of it by so doing, 'tis there, in my Opinion, a regular Scheme ought to take Place.

But when the Wood is plac'd near the House, it is design'd chiefly for Walking, to be as private as is consistent with its own Nature,

ture, as when it is naturally compos'd of several Levels, Hills, and Hollows. This is a Place design'd by Nature, for the Exercise of a good Genius in Gardening.

'Tis in large Hollows and low Grounds, and in the Middle or Center of Woods, that we make our little Cabinets and Gardens, of which some are to be found in this Book, and others may be taken out of Mr. *James's*, besides an infinite Variety that may be contriv'd; but the Lines extended from them should not be carry'd out too far, for that will make one unavoidably split upon the former Error of Regularity.

If Water is to be had, one ought to look for convenient Places to make Heads at (at as little Expence as possible) and to frame such Figures as are most suitable to the Nature of that Hollow; so likewise of Hills.

If the Wood is thin, 'tis there one may clear it quite away, and make open Lawns. And if the Wood be an Eminence, then all the small Stuff on the Outside ought to be clear'd away, to open the distant Prospect, if it deserve it; but if it be an unsightly, barren Prospect, then let the Wood remain to blind it.

These, and such like Particulars as these, ought every Designer to observe, and then the regular Designer will not be so much blam'd for his Regularity, in as much as it is an open level Park, is not plac'd near his House, or is on the North Side, where Gardens and Walking-Places are not so absolutely requir'd,

requir'd, but his Design is for an open spacious Wood, where the Owner is to ride, hunt, &c.

Neither will the natural Gardener be observ'd to have err'd, when he has fill'd all his little Eminencies and Hollows with little Gardens, Statues, and other rural Decorations; for his Wood is entirely for walking in; it lyes high, and he is not observ'd to have cut down any noble Trees, when, in Truth, the Nature of his Wood would not allow it; neither has he shewn himself fond of any Mathematical Figure, but has made his Design submit to Nature, and not Nature to his Design. The Inside of his Wood is fill'd with Hares, Pheasants, the Statues of Rural and Sylvan Deities all cut out in Wood, while he contrives likewise that living Hares and Pheasants shall abound; by which Means, besides the couchant Furniture in Imitation, he has really a great deal that is alive and in Motion, darting themselves a-cross him where-ever he turns himself. He is often surpriz'd with little Gardens, with Caves, little natural Cascades and Grotts of Water, with Pieces of Grotesque Painting, Seats, and Arbors of Honeyfuckles and Jessamine, and, in short, with all the Varieties that Nature and Art can furnish him with. But this is but a very imperfect Sketch of what a judicious Person may compose in this beautiful Wood.

Proceed

Proceed we now to the designing and laying out of open, large, spacious Woods in Parks ; and afterward to the other more retir'd and mere natural ones, design'd for Walking and solitary Amusements, after we have remark'd some few Things as to the right placing or misplacing of Wood ; for this is too common an Error. I have touch'd something of this elsewhere, but it likewise falls in properly enough here.

Of Wood misplac'd.

Wood is misplac'd, when it is too near the Eye in any Place, when it crowds so close up to it, as to admit of no open Lawn or Breathing, if it may be so term'd ; for, besides that it stops the View too short, it likewise thickens the Air, and makes the Situation unhealthy. It is likewise misplac'd when it hinders the pleasant Prospect of any noble View ; such is the Sea, or distant blue Hills, or when near ones, and cloathed with Wood or fine Turf. Be a Wood, therefore, itself never so beautiful, it would almost tempt the Owner to cut it down, except he has any other Prospects that exceed it. And if he should build in the Middle of any thick Wood, or does intend to sow or plant, he ought, at least, to open an Avenue of 100 or 150 Foot wide that Way, while his natural Meanders should be in Wood, as near as possible his House. And in such Places where
the

the Wood does not hinder a better Prospect ; this is supposing the Wood is upon a level Ground ; but if it is upon a rising Hill, it ought not to be cut down by any Means, in as much as Nature has thrown that in the Way, to supply all the other Defects of the Situation.

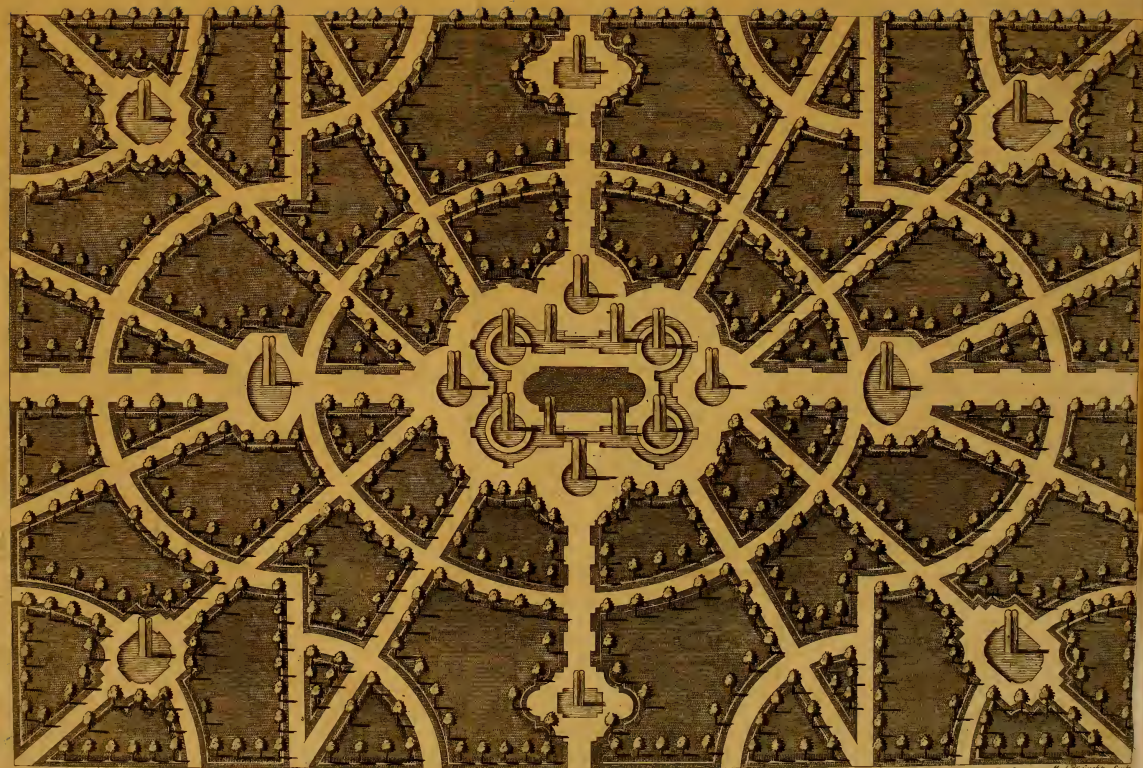
In general, Wood on the South Side (if the Prospect be not extreemly fine) is not desirable near at Hand, as lying too contiguous and interwove with our Gardens ; but should be clear'd away, and an open Lawn or Parterre made, detach'd of all the Angles of Building ; 350 or 400 Foot at least from the Front of it in small Buildings, and 5, 6, 7, or 800 Foot in larger. In which, as we have observ'd in the Chapter concerning Parterres, the Width of the main Body of the Building (not the Wings) is our general Direction ; wherein we should allow, at least, twice the Width of the Building, for the Distance of Wood from it, and, if possible, without cutting down too much Wood, two times and an half, or three times, tho' it come near up to the Outside Angles of the Edifice.

But as to the North Front, which is, generally speaking, the most champion View, there the opener and larger your Lawn is, 'tis still the nobler ; and if the Wood is not already grown, a Lawn of at least a quarter of a Mile in Length ought to determine the View. For Wood plac'd at that Distance, or in larger Places six times the same, affords a most noble Termination to the View, as
may

may be seen in that incomparably beautiful Park of his Grace the Duke of *Ancaſter*, at *Grimſthorpe* in *Lincolnſhire*, and other Places. In fine, Wood plac'd at a Diſtance, and upon a Riſing, is, beſides its Uſe, one of the nobleſt and moſt pleaſing Views in Nature. But for the farther Illuſtration of this, I refer to the Chapter concerning Situations, and the Plate of the Diſtribution of Parks.

In the Interim, I can't but obſerve a great Fault in many of our Deſigns, in bringing our Avenues cloſe to the Court-Gate, by which Means we very often loſe the Beauty of a very noble Lawn, while the Walk would at the ſame Time anſwer its End at a great Diſtance, were it to begin a quarter of a Mile from the Houſe. Beſides, as I ſhall hereafter ſhew by a Scheme, Wood in this Caſe crowded up too near an Houſe blinds it; and I will affirm, as I ſhall by and by by Mathematical Demonſtration ſhew, that a Walk of an hundred Foot wide, if the Wood is not crowded too cloſe to the Building, will ſhew it as much or more than one of the full Width of the Building, ſuppoſing it two hundred Foot, where is a large open Lawn before it; and this will conſiderably ſave that Deſtruction of Wood which is very often on this Account made.

Obſerva-



Observation on Plate 32, Fig. 1.

This Plate contains the Draught of an open Grove or Wood, cut out into Walks, with Mountains and Basins in it, and may serve for a little Park; for if it is on the North Side of the House, one can't turn it into any Thing more advantageous; since, in the first Place, the making is much cheaper than any strict Garden. And, indeed, I believe the World will allow it to be much more naturally beautiful and noble, than the most elaborate fine Garden; and, as for the keeping, 10*l.* per Ann. on a Boy and Horse, a long Pole to cast about the Worm Casts and the Deers Buttons, with a Paddle to cut and root up any staring Weeds or Thistles, and a Bill fix'd in a Pole, to cut off such Boughs as are apt to grow in the Way will be sufficient; this 10*l.* will do as much as 100*l.* in the keeping of a very fine Garden, besides the Beauty and Nobleness there is in seeing of the Deer feed in the open Lawns, and running backward and forward through our whole Design. This Design I have lately compos'd for a Gentleman; and since 'tis not yet executed, I here place it, at the Front of my Designs of Wood-Work.

We have purposely design'd to clear away all the brushy Under-wood, in order to make the Grove the more open; besides, the Deer would break it in Pieces, and make it appear so ill, that one ought by all Means to take
this

this Care, in order to prevent that Blemish; and it can't be deny'd, but that an open Grove is as beautiful as a close one.

The natural Lawns in the Inside, are likewise purposely clear, so that there the Deer may lye undisturb'd, and have their Food sweeten'd by the Sun and Air.

The Walks are most of them Grass, which the Deer will keep close as to the Mowing Part; and as to the rolling, sweeping, &c. it is to be done by a Man, Boy, and an Horse, I can't see but this whole Design, (which is near 30 Acres, and might in any such like Case be two or three hundred) will appear as pleasant as the finest Garden in the World.

It being so very plain and apparent in it self, upon Paper, I shall not multiply Words to no Purpose in the farther Explanation thereof.

Observations on Fig. 2 and 3, Plate 32.

Figures the 2d and 3d in this Plate are the Plann and Elevation of a large open Lawn in the Middle of a Park or Wood bounded by Lines of planted Trees; but this ought to be above 1000 Foot long, and 800 Foot wide, by which Means it will appear the noblest Center that is in any Design that I ever saw, and deserves a much larger Figure to express its Beauty; but such is our Misfortune, that 'tis very much to be doubted we have already

ex-

excell'd the Strength of our Pockets in Plates, and there being a Necessity of having some more, we are oblig'd to contract our Sails as much as possible, lest perhaps we fail in the Midst of a too adventurous Flight. But to the Figure.

This little Attempt will shew, that the Plattoons at each Corner, are, by a natural Elevation, mounted up into Turrets, while the Inter-spaces are kept low, and appear like Piazza's, to convey one from one Turret to another.

This, I presume, is altogether new in Planting, especially as to the Elevation of the Turrets, which I shall therefore say something the more of.

There are few Gentlemen, it is to be suppos'd, but what have some larger Elms and Lymes than ordinary to plant those Plattoons with; and very useful in this Case are such Avenues that are of 18 or 20 Years planting, where the Trees stand too thick, which is the Fault of almost all the Avenues that have been planted within these twenty or thirty Years last past; so that 'tis not only possible, but also very requisite, that every other Tree should be taken up; the Line it self will be maintain'd every whit as well, and the Trees that remain will spread themselves the better. This being granted, you are to take them up carefully, (as will appear in its proper Place) and prune the Head of the Trees, be it either Elm or Lyme, into a Conic Shape

Shape, and those Snaggs or Boughs that are left, will throw out Branches in abundance, and will at once form a Kind of a Turret, while the Intervals of this, or any other Figure, may be planted with new Boughs, or lower Trees, and so kept low, by a little pruning, that the great Trees may form something in the Nature of Towers, and the lesser will appear, as intended, in the Nature of Corridores and Passages.

And this third Figure shews how much may be borrow'd, both of Terms and actual Directions in the designing and laying out Gardens, from military and civil Architecture. And 'twas from the first of these that the Ancients form'd their Rules in the planting and disposing their Groves and Gardens, as may be learnt from *Virgil*, and other Authors. And of this Kind, 'tis certain, were the regular Plantations of the magnificent *Cyrus*, *Dioctlesian*, &c. whose Memoirs have had a Place in the first Volume of this Work; to illustrate which, I shall give my Reader a particular Plate, if this Book swells not too fast on my Hands.

The Plattoons at the Angles, and the Distance of all the Trees in the Intervals between Platoon and Platoon, may all be at twenty five Foot, tho' the Scale is so small in this Figure, that no Certainty can be gather'd as to their Distance.

Observa-

Observations on Plate 32, Fig. 4.

This is the Figure of an open Lawn in a Park or Wood, to which, from six Centers, are brought eighteen Walks, besides the main Walk that runs thro', which, reckon'd from the Lawn it self, makes twenty.

There is little to be observ'd in these grand Centers and Lawns, but that they ought at all Times to be of a considerable Width; and this, in particular, ought not to be less than 250 Foot long, and if longer, the better, even 500 Foot; by which Means the Walks will be all considerably widen'd in Proportion. And 'tis also suppos'd, that this Design is for an open Park or Wood, that lies on the North Side of an House, upon a Flat, and for Ridings only; since, were it us'd for rising Hills and daly Ground, where there are but few large Trees, this Method would undoubtedly spoil the whole, and make it too publick for a private Walking-Garden, and level to the Ground those ancient Trees, which our Fore-fathers had all along preserv'd with much Care.

It must be observ'd, that there are several Niches in the middle Walk, to place Benches and Statues in; for these add very much to the Beauty, as well as Convenience of any Garden or Wood; and it cannot but be esteem'd a considerable Fault where-ever it is neglected. If there are any that will be at

the Trouble and Expence of placing more in other Walks, especially in Centers, I can't but commend it; but this should be not over-lavishly, since 'tis easy to foresee that a large Expence attends it.

I shall, in the next two Plates, give some particular Designs for Centers in little low-shrub'd Wildernesſes, that from some little Eminencies may be view'd with Ease: And then, after ſomething of regular Groves, ſhall come to what has been all along my chiefest Aim, *Natural and Rural Gardening*.

Observations on Plate 33.

We come now to regular Groves, Labyrinths, &c. which have likewise their particular Beauty, as indeed this will, upon a few Considerations, appear to have.

The Center is compos'd of a neat Grass-Plat, encompass'd round with Festins and *Fet-d'-Eau's*, or Falls of Water; which must have a very good Effect, as it will appear every where thro' and under the Trees, especially at the Ends of the Walks, and in the Passages thereof up to the Center.

It may be observ'd, that under the Standard Trees I have design'd Hedges; which Hedges are to be of Eugh, or, rather, *Swedish* Juniper, kept cut to about two Foot high; and the Standards, which I suppose to be most of them Eughs, (in as much as they are not
so

so apt to foul the Walk :) And if the Planter pleases, he may, between every one of them, plant little strip'd Standard-Hollies, about three Foot and an half in Stem; and these will look very bright amongst the Dock-Eughs, and very much diversify the general Eughs; but this I could not express here, the Scale being of the smallest.

The Insides are to be all Grass-Works; whether plain or cut, I leave to the Opinion of the ingenious Gardener; but be it which it will, it can't but look well. And the Niches in the Verge, on the middle and cross Walk, are to set Benches on, detach'd and clear of the Gravel; or may otherwise be left plain: Tho', if we would mix the *Utile* with the *Dulce*, the Quarters may be stock'd with such Sorts of Kitchen-Stuff as are not offensive, as are Cabbages, &c. for Pease, Beans, Artichokes, &c. being kept clean, will look as well as any Thing, and pay for their keeping.

The full of this Plate is, then, an open Grove, with regular Walks, &c. which, as they will certainly make an agreeable Confusion, and an imperceptible Regularity, may be admitted into the best of our Gardens and Woods; and they have this above common Wildernesses, that they are more airy and light, and are still as shady as any others.

This Design may also be turn'd to a regular Wilderness, or a promiscuous open Grove, as well as this (as may some of the others I have given) which will, I hope, make them the more acceptable.

Observations on Plate 34, Fig. 1, 2.

'Tis certain, that the Quadrate and Quincuncial Manner of planting and ranging Trees, is the most ancient, since it is confirm'd from *Abydenus*, *Eusebius*, and others, that *that* was the Form of the *Hanging Gardens* of *Babylon*, as describ'd by *Q. Curtius*; and in the memorable Garden of *Alcinous*, anciently conceiv'd (as *Sir Thomas Brown* words it) an *Original Fancy from Paradise*, there is Mention made of well-contriv'd Order. *Diomedes*, (as the same Author quotes him) describing the rural Possessions of his Father, gives an Account, in the same Language, of Trees orderly planted; and *Ulysses*, being a Boy, was promis'd by his Father forty Fig-Trees, and fifty Rows of Vines producing all Kinds of Grapes.

The Author of the *Theory and Practice of Gardening*, has, in his excellent Book translated by Mr. *James*, given us a Specimen of what he calls Planting in *Quincunce*, in which he is in this mistaken; because, in his Design, the Trees are all planted square, or at Right Angles, when, in Truth, the Quincuncial Disposition of Trees,

is

is alternate, like a Figure of 5, as it is English'd from *Cicero*; and so three Trees form thereby an equilateral, or sometimes an equicrural Triangle; four Trees, a *Rhombus*, or Lozenge; and five, a Figure of 10. But, to finish our Observation on this Author's Mistake, and go on: This Method was not only in Use in planting of Trees, but also in many other Arts and Sciences, and especially *Military Discipline*, and was, perhaps, by them brought into Planting therefrom:

Thus *Virgil*:

*Sic tumulis acclive solum collesque supinos
Indulge ordinibus, nec secius omnis in unguem,
Arboribus positis secto via limine quadrat,
Ut saepe ingenti Bello cum longa Cohortes
Explicuit Legio, & campo stetit Agmen aperto,
Directæq; acies, ac latè fluctuat omnis, &c.*

By which handsom Description of *Virgil*, we find this Quincuncial Method to have its Original from the Methods observ'd by the Generals of the Antients in ranging their Armies. The *Rhombus*, or Lozenge Figure, was a remarkable Form of Battle in the *Grecian* Cavalry, observ'd by the *Pallians*, and *Philip* King of *Macedon*, and frequently by the *Parthians*; and the *Roman* Battalia was order'd after the same Manner; for thus the *Hastati*, *Principes*, and *Triarii*, were plac'd in their Bodies, and in these consisted the main

Strength of the *Roman* Battle; from which, and from innumerable other Considerations, the ingenious *Sir Thomas Brown*, in his well-known elaborate Essay on the Gardens of *Cyprus*, has establish'd this Quincuncial Method. And *Julius Cesar*, in his Approaches to the strong Town of *Alise*, in his Lines of Circumvallation, fix'd in Stakes up to the Head, after this Manner, in order to baffle the *Gauls* in their Assaults; as we learn from his *Commentaries*.

And the ancient Authors, *Varro*, *Quintilian*, and the aforementioned *Q. Curtius*, recommend it as highly beautiful; but *Virgil*, in particular, recommends it for its Use too :

*Non animum modo uti pascat prospectus inanem,
Sed quia non aliter vires dabit omnibus aquas
Terra, neque in vacuum poterunt se extendere
rami.* Virg. Georg. 2.

But we may observe, that the Advantage of this Quincuncial Method is so much beyond the Quadrate, that an Acre of Ground, where they are planted at equal Distances in the Rows, this Way, will have at least a fifth Part of the Number of Trees more than the other, and that by Means of their alternate Disposition. And this is particularly a very good Way in planting of an Orchard, or any other Plantation, where the Planters would dispose of as many Trees as they can.

To come then to our Method of dividing our Plantation after this Quincuncial and Quadrate Manner, on which the afore-mention'd ingenious Author, Sir *Thomas Brown*, has spent about 100 Pages. When the Width of a Piece of Ground is taken, you are first to square it out exactly by the Method heretofore deliver'd, in the *Mathematical Instructions for Gardeners*: Which done, and four Stakes set, one at each Angle of your Work, divide it by an uneven Number, such as you think will divide the Rows of Trees at fifteen, twenty, or twenty five Foot Distance, more or less, as the Occasion requires. As for Instance, in the 2d Figure of this next Plate, the Distance from Corner-Tree to Corner-Tree is 306 Foot, which, by Way of Essay, I divide by the uneven Number of 17, which gives 18 in the Quotient; and that 18 is the Number of Trees in that Line, at 17 Foot Distance. And the Reason that I divide by this or any other uneven Number, is, that thereby the Trees range every Way, which, if they were divided by an even Number, they would not do. But this is chiefly useful in Avenues, or where there are large Walks that pass through one of these Plantations, in which, if you do not take this Method, the Trees will not range. But in regular Avenues, where Ranging is requir'd, it being, indeed, the very Principal requisite in these Kind of Works, it is very necessary, as will hereafter appear,

when we come to speak of *Parks* and *Avenues*. But now to pursue the Thread of our Instructions.

In this Case the Planter should therefore choose such a Number for his Distance as the Nature of his Tree requires: If it be for Dwarf-Fruit, 13 Foot will do; if Standard-Fruit, 17, 19, or 21, and, sometimes, in rank-good Ground 25 Foot; but, if it be for Forest-Trees, which is at present our suppos'd Case, (tho' the general Scale does not admit it) then they ought to be at least 27, 29, or sometimes 31 Foot; and, by this Means, if you square out your Ground exactly, and plant the outer Rows first, all the rest will range quite thro' your Design.

And if it be an Avenue, or there are Walks passing thro' it, you must always make the middle Width exactly two, three, or four Times the Width of the common Distance of your Trees: Thus, for Example, if your Trees are at 31 Foot Distance, your Walk, if it be about 100 Foot in the Design, must be reduc'd to 93 Foot, which is three times the common Distance of your Trees; and then let your Avenue be wider or narrower, or the Ground be near a Level, your Trees will range every Way. In order to this, you ought to be very exact in squaring and measuring out your Distances, or you'll be puzzled.

When you plant, therefore, in the Quincuncial Manner, as in the 1st Figure of the next Plate, you are to allow about 25 Foot a-funder

funder in the main, 15, 17, or 19, for Dwarf Fruit, and 35 Foot at least for Forest-Trees; because it is requir'd so to be by the Largeness of their Growth more than Forest-Trees. And by this Quincuncial Distribution of them, because, even by this Means, tho' the Divisions on this Figure are larger than the other, yet does one hold near twenty Trees more than the other, and also the Trees have all necessary Room; which makes evident what I have before asserted, that this Quincuncial Way is the best, in as much as it holds more Trees than the square Way does. Yet it must be observ'd, that when any Person goes to set out one of these Quincuncial Plantations, he will have Occasion to use double the Number of Stakes, that he does in the Quadrate, that so he may range them in alternately, and make a Figure of V, with three Trees, quite thro' his Plantation, &c.

After the whole is thus figur'd out on the Paper, or actually planted on the Ground, 'tis then the Cross-Walks, or let them be direct, or, indeed, any other, that the Figure best admits; but it must be noted, that in all direct Walks, the middle Line of Trees, or sometimes two or three Lines, must be left out, both to give the Walk its proper Width, as also that the Trees on each Side may be directly opposite, which they would not otherwise be. But in all Diagonal Walks the Quincuncial Method is best, being by the alternate Disposition of the Trees both
parallel

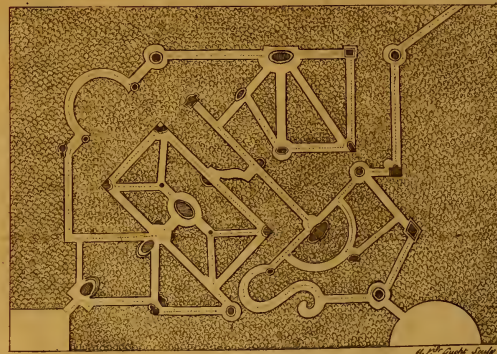
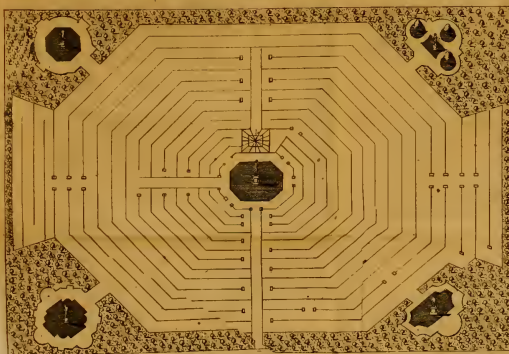
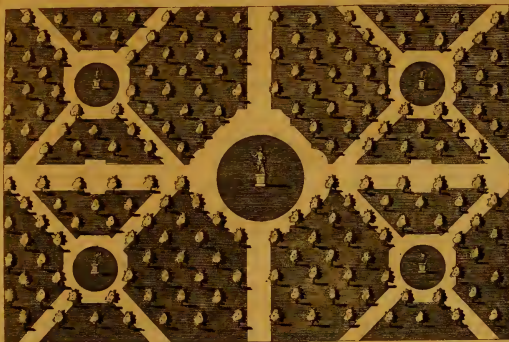
parallel and opposite, as may be easily observ'd by viewing the Figure it self, Numb. 1, in the next Plate.

It will not be requir'd I should in this Place lay down the Method of Planting it self, that having been already hinted at, and will in all its Parts (I hope) evidently appear in the Sequel of these Endeavours I am making to oblige the Planting World.

Proceed we then, in the next Place, to the third and fourth Figures in the next Plate.

Observations on Fig. 3, 4, Plate 34, concerning Labyrinths.

It will be needless, in this Place, to examine much into the Etymological Derivation of this Part of Gardening, or of its Antiquity, it being well known to signify a winding, mazy, and intricate Turning to and fro, thro' a Wood or Wildernéss. This is what the Antients took particular Delight in; and the Poets chose them for some of the pleasantest Themes of their Works. But, to quit this, we may observe, that those that have been of late made in *England*, and, indeed, some old Designs we have in several Parts, and in several ancient Books publish'd in our own Tongue, have been all of single Hedges. And, by the Way, we may likewise observe, that this Part was, and has always been, one of the first Steps made in Gardening, in most
Coun^s



Countries, particularly in our own: And we may observe to have seen very intricate Labyrinths in our old Books of Gardening, when at the same Time the other Designs in Gardening were altogether mean and insignificant.

The third Plate is a Labyrinth of single Hedges, or Banks, after the ancient Manner, tho' not altogether of the same Figure; for when I come to consider the Use and Nature of a Labyrinth, according to all the Constructions that have ever been made of it, *viz.* That 'tis an intricate and difficult Labour to find out the Center, and to be (as the Vulgar commonly like it for) so intricate, as to lose ones self therein, and to meet with as great a Number of Stops therein and Disappointments as possible; I thought the only way to accomplish it, was to make a dubious Choice of which Way to take at the very Entrance and Beginning it self, in order to find out the Center, at which we are to end at B, into a little Arbour cradled over; for which Reason there is, in the very first coming in, in the Center, where the Grass-Plat and Statue are design'd, at A, six different Entrances, whereof there is but one that leads to the Center, and that is attended with some Difficulties, and a great many Stops.

The most that ever I observ'd in this Case, are at *Hampton-Court*, where, I take it, there are but three or four false Stops, or Methods to lose or perplex the Rambler in his going

in;

in; whereas in this there is above twenty, and I presume to say, (if it were of much Value when I had so said) that 'tis not a very easy Matter to find this Center, without the Draught or perhaps with it. But, be it as it will, it is of no great Use to enlarge upon it, after the Design is thus fix'd; and in the large Quarters and Division of a Wood, this may give some Light in the making them intricate and perplexing, and may help to accomplish our Garden-Amusements.

The fourth Figure is the Draught of the Labyrinth at *Versailles*, which is allow'd by all to be the noblest of its Kind in the World, and which I here place, to give my Countrymen the Taste of the *French* in Labyrinths; and because this Draught may not by any other Means fall into the Hands of many of my Profession, I have given it as it is, there us'd; and I may venture to say, that it is the only one that I have not compos'd thro' this whole Undertaking.

At the End of every Walk, in the View, as one passes along, are plac'd some of the Fables of *Æsop*, which all of them are a continual Entertainment to the Ambulator.

The Walks are cut out (on Plate 8) in a Wood; and so there is a considerable Thickness of Wood between Hedge and Hedge, which, in Truth, is much better than our single Hedges; besides theirs are of quite another Use and Turn from what ours are; but having given one of each, I have, I hope,
done

done what is requir'd of me, choose which you will. Their Way is fittest for very large Spots of Ground, but ours for small ones; but there is one Thing particularly attends ours, which is the Narrowness of the Walks, by which Means the Hedges must be always kept clipp'd; and which, in theirs, and according to our Method of Rural Gardening, need not. But I pass over this, and come to some other Centers, Figures, and Ornaments, in our Wood-Work; and the first is deduc'd from Architecture.

Amongst the several Arts and Sciences from which the Theory and Practice of Gardening receives its Beauty, this of Architecture is the greatest, whether we consider it in Respect of the Rules and Terms we borrow from thence, in the laying out and distributing 'em, or the Idea's we receive from thence in Point of Design.

We have, in some Places of this Kingdom, already some faint Pourtraitures and Beginnings, of designing and laying down some little Spots of Gardening, in the Manner that the Ichnography or Plan of a Building is; and by the Means of Eugh and other tonfile Greens, to imitate the Elevation thereof, in Columns, Pilasters, Niches, &c. And this I remember to have seen something of at *Winchendon*, against a Wall there, where the Greens are cut into Pilasters, &c.

From

From these Beginnings, I thought I could not better employ my Time, than in giving one Plate, to farther and improve what has been so imperfectly began; since hereby one of the greatest Additions may in Time be made to the Beauty of our *English* Gardens, that has in any Age or Country been made. And the Truth is, when we consider the great Quantities of tonfile Plants we abound with, there is not, at first Appearance, any better Method of disposing of them than this, neither has any other Country so great an Advantage thereby as we have.

To prove this Assertion, we need only view those prodigious Magazines of Eughs, Hollies, and other Greens, that are growing about *London*; and how much they may add to the Beauty of our wildest Plantations, by being us'd sparingly, in some Centers of our natural Wood-Works, where the Owner is often glad to find some few Elegancies, and neat little Gardens, made and kept by Art, amidst the Variety of natural Objects he is creating to himself, and with which he is by Nature furnish'd: Such, in particular, is that beautiful Hollow at *Kensington*, with the several Cabinet-Recesses and Niches round it; and such as this Plan, or any other of this Kind, may present him with; there is something in this entirely pretty and new in Gardening.

To begin then (by Way of Description) at the circular Steps, on the Extremities of the Draughts, you rise up into an handsome Avenue, planted on each Side with Eughs, cut into double Pilasters, and each bounded with a shady Corridore or Piazza; and these, if the Eughs are planted large, *viz.* seven or eight Foot high, will soon form themselves, by a little Cutting, into Arches, Vaults, Groves, and all the other Beauties we borrow from Architecture.

To proceed in this Plan, you come by Degrees into the Center, or Middle, and whereas you had before been introduc'd by double Pilasters, on each Side of your main Passage, Avenue, or Cloister; here the Middle it self is environ'd with circular single Columns, and in the Inside with Niches and Pilasters, in which Niches, I suppose, Statues, Urns, or other such like Decorations, which, being white, will be very much set off by the Darknes of the Eugh; and at each Angle I have propos'd (as appears by the Design) that there shall be little Salloons, with Seats to sit down, or what else may be thought an Addition thereto.

'Tis easy to observe likewise, that on each Side are several little Rooms or Cabinets of Retirement, one within another; and, as all of them are furnish'd with Niches for Statues, Urns, and other Vases, and in the Middle some little Grass-Plat or Fountain of Water, I cannot but hope it will be thought extream-

ly pretty and diverting; and for the farther Accomplishment of this Kind of Work, the Plates, I have already intimated, will sufficiently direct.

The Entrance and Center being thus explain'd, at the upper End (as we term'd it) may be observ'd a Mount, of two Risings, in all eight Foot high, planted round with square Eughs, at about four Foot Distance, (let it be more or less on the Draughts;) and these will likewise, in a little Time, form Arches, Pilasters, &c. and, in short, a natural Cover from the Sun. And this Elevation is so much the more to be desir'd, because 'tis there we may stand and look round, and with Ease view all the adjacent Works, and particularly these natural Corridores, which tho' they will be expensive in keeping, must be esteem'd the most surprising Decoration that any of our Gardens yet afford.

I need say little as to the other Centers in the Outfides of this Work, they explaining themselves, being no otherwise than what is and has been common enough with us; and the Disposition of the rest is easily manag'd. I could be more particular in describing this Plan, but I fear I have hitherto been too prolix in the pleasurable Part of Gardening, for which Reason I shall omit it.



C H A P. VIII.

Of Espalier Trees, Hedges, &c. and their Management.

AS a general Security for a Garden or Plantation against Blasting and tempestuous Winds, it is necessary to plant substantial and lofty Vegetables; these are call'd Espaliers, and are likewise us'd for the bounding of Borders, Walks, Avenues, &c. but most commonly for the Defence of Plants and Greens.

The several Sorts of Trees fit for Espaliers, are, the *Dutch* Witch and *English* Elm, the Lime, Abeal, Pine, *Scotch* Fir, Siccamore, Beech, and Oak; but the Elms and Limes are very preferable to the others; and the Firs and Pines, next to them, deserve Place. In the Choice of these Trees, and Transplanting, great Care ought to be taken; they must be strong, and the larger the better, as they will

the sooner answer your Purpose : You are to take them out of their natural Earth with as much Root to them as is possible, and they ought to be moderately prun'd, so that their Heads be not left too tall at their first Planting.

If your *Espaliers* are *Pines* and *Firs*, they are to be elected from some Nursery when they are about three or four Foot high, but not transplanted 'till they arrive at seven, eight, or nine Foot in Height ; when they are to be taken up with almost all their Roots, and as much Earth about them as three or four Men can carry with each Tree in a Hand-barrow ; this Earth, remov'd with them, will be a great means to fix them where they are to be planted anew, and likewise prevent all ill Consequences which might hinder their Growth.

Your Trees thus chosen, we come to the Planting, which must be by no means too deep, especially if the Ground incline to Moisture, for thereby many Trees are spoil'd. As soon as they are planted, Care is to be taken that they be very well stak'd, or otherwise fenc'd, as a Guard against violent Winds and Cattle, 'till they have taken Root sufficient to subsist of themselves ; and they are, upon all Occasions, to be plentifully water'd. The *Firs* being perpetually green, and aspiring to a great Height, appear very beautiful ; and what
adds

adds to their Usefulness, is their long Duration.

Before Gentlemen begin to make their Gardens, these Plantations of Espaliers ought to be finish'd, that no Time may be lost, or Injury ensue to the tender Plants for want of a necessary Security. They are to be planted at a reasonable Distance without the utmost Bounds or Walls, and the Method of doing it is this; First draw Lines for two or three Rows, pretty thick, having Regard to the Use they are for; and when the first Line is set, let the second be planted in such Order, that every three Trees may make an *Æquilateral Triangle*, by which means the first Range will be clos'd by the second; after this, a third Line is to be planted, which must bear the same Proportion to the second, as the second does to the first: And with these Ranges of three Rows the whole Plantation, or Garden, may be encompass'd, if it can be conveniently done.

This Way of Planting is of excellent Use and Benefit to all Persons who intend to make large Plantations of Firs and Pines for Avenues, Views, or Walks of Shade in Pasture Grounds, Parks, or other grazing Grounds, or to bound their Gardens by delightful Visto's. And if you are to make Espalier-Hedges, for the Defence of tender Greens and Plants, from malevolent Winds, the Trees for your Use are the following; the *Dutch Witch* and *English Elms*, as before,

the Horn-beam, Spruce Fir, Pine, and *Scotch* Fir, Lime, Privet, Yew, Holly, Laurel, White-thorn, Maple, Alder, Apple, Pear.

The *Dutch* and the *Witch Elm* are the freest Growers; and come soonest to Perfection; And if they are for a Frame of Wood, and to be serviceable the first Year, they are to be chosen of two Sizes, the first about eight or ten Foot high, and the second about four or five Foot in Height; to be good brushy Trees from Top to Bottom as near as may be, and let them be prun'd, but so that the Side-Boughs may remain to spread out and be fasten'd to the Frames. The large ones are to be planted about three Foot Distance from each other, and between them are to be planted the lesser siz'd ones. But if your *Espalier* Hedges are to be made without a Frame of Wood to support them, then the Trees must be of a smaller Size, the largest to be not above six Foot in Height, and the small ones of about three or four Foot high; they are to be planted as the others, but the Boughs must be cut within an Inch or two of the Stem, and as they grow they are to have frequent Clip-pings to make them thicken in Brush, and grow upright and uniform, whereby they'll appear like a Wall.

The *Horn-beam* and *Beach* are inferior to none, for an *Espalier*, of those Sorts of Trees as shed their Leaves; but they cannot be planted so large as Elms. Chuse
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two Sizes, the largest of four or five Foot high, and the smallest of two or three Foot, and plant the largest at eighteen Inches Distance. The *Spruce Fir* has great Advantage over the others, by it's being green all the Year, and it will best endure a discretionary Clipping; let the largest Plants be about three Foot and a half long, and the smallest about two Foot in Length, and plant the large ones about eight Foot asunder, with the smaller Size Plants between them. The *Pine* and *Scotch Fir* require the same Management

In the ordering *Limes* for *Espaliers*, the largest Size may be six or seven Foot high, the lesser three Foot high, to be planted in the same Order and Distance as the *Elm*. *Yew* makes a noble, firm, and durable *Espalier*, and for this Use will excel the best Brick-Wall; you are to make a Choice of the largest of about a Foot and a half high, and the lesser about nine Inches, or a Foot, the large ones to be planted about two Foot asunder, and the small ones between them: The *Holly* makes an excellent *Espalier*, continues green all the Winter, grows exceeding thick, disdains the Power of the severest Storms, and if these Trees are well managed they'll grow at least two Foot in a Year.

The *Laurel*; the large Plants to be about three or four Foot high, and the small ones about a Foot and a half; the largest to be

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planted at three Foot Distance. *White-thorn* and *Privet* make very good Hedges, but they are not to be planted so large as other Trees. *Maple*, if planted of young Sets, will make tolerable Espalier Hedges, and thickens well after Clipping; and *Alder* for a wet or moist Ground, makes a substantial Hedge. *Apples* and *Pears* will make good Espaliers; if your Choice be of the largest Size from Standards aspiring in height, and growing upright, and the smaller of Dwarfs, or good bushy young Trees; the Sizes to be much the same as the Elm, and they are to be planted about four or five Foot Distance from each other: These last mention'd Espaliers are very useful for the bounding of Kitchen Gardens from the Sight of Walks or Gardens of Pleasure.

The wooden Frame for Espalier Hedges is necessary where the Use of those Hedges is requir'd, the first or second Year after planted. These Frames are to be made very substantial, about seven, eight, or nine Foot high; the Distance of every Post asunder, and the length of the Rails to be equal to the length of the Posts, which is commonly about eight Foot for an Espalier Frame of the same Height from the Surface of the Ground; and to this Frame there may be six Rails, each being about sixteen Inches asunder. The higher the Trees are that are planted, the more substantial ought the Posts to be for their Support, and Care must be taken that the Frame be erected upright and straight;

straight; and all the Sizes of *Espaliers*, for these Frames, are to be so regulated, that the Trees or Plants may be of a handsome uniform Growth, and sufficiently furnish'd with Side Boughs, to thicken and fill up the several Spaces.

The Form of the Ground for *Espaliers* ought to be oblong; and in laying it out, the two longest parallel Sides should run *North* and *South*, or thereabouts; and as for the Extent, you are to proportion it according to the Number of the tender Greens and Plants which you design it shall receive; always allowing for proper Distances in placing them, and for Allies. The Situation ought not to be remote from the Green-house, for Convenience in removal of the Greens, forward and backward, as Seasons shall require. In marking out the Dimensions make Allowance likewise for the Borders, which should be answerable to it, and well trench'd, two Foot and an half or three Foot deep; for if the Soil happens not to be naturally good so deep, and you do not enrich it, after the Trees have been planted some Years, when they come to strike Root, they'll penetrate down to the poor barren Earth, and become thereby exceedingly hinder'd in their Growth.

Espaliers deaden the Violence of the Winds with greater Security to tender Greens and Plants than the best Brick or Stone Wall, by Reason Walls, being compact and close built, have a stronger Power to drive them back
and

and therefore detriment the tender Plants that are near; but if the most tempestuous Wind beats against these Espaliers, (especially if they are made of Spruce Fir, Holly, or Yew) they give Way to its Force, without any Manner of Repulse, or Injury to the tender Plants encompass'd by them.

Pines and all Sorts of *Firs* look very well when planted as Espaliers; they make a fine tow'ring Figure in the Winter Season, when all other Trees are rusty, and the Fields have likewise lost their Verdure; and if they are planted on a rising Ground, so as to be in View at a distant Prospect, they appear very noble, and agreeably adorn a magnificent Seat. I proceed now to the profitable Part of Gardening.





C H A P. IX.

Of Fruit-Gardens; Planting, Pruning, Grassing, &c. of Fruit-Trees.

THE Situation of a Garden is always the first Thing to be taken Care of; and tho' a little Valley, or low Ground, is the most agreeable for Kitchen-Products, yet Ground on a moderate Elevation, so as not to be too dry, is every way best for the Fruit-Garden: For if the Fruits do not grow so large in such a Soil, yet it will be recompenc'd in their Beauty, Richness of Taste, and Forwardness: But if your Situation be so high as to incline to Drought, or be on an exact Level, 'twill be necessary to lay out your Ground on a little Inequality, but such a one as may be unperceivable, and that the Water in the Southern Walks may fall to the Roots of the Trees.

Next

Next to the Situation, the Exposition of a Garden is to be regarded. And whatever Situation you are forc'd to submit to, it ought to have all the Aspects of the Sun; tho' the Variety of Soils makes, in many Cases, a particular Exposition the most agreeable. If your Garden be of strong Earth, and of Consequence cold, the South Exposure is best; but then this Exposition is very subject to Winds in the Autumn. If the Soil be light and hot, then the East Exposition is to be preferr'd; but this is annoy'd by the North-East Winds, and the Wall-Trees have little Benefit of the Rains which generally come from the West. The Western Exposure is very liable to the North-West Winds in the Spring, and the Autumn Winds. And the Northern Aspect is only fit for Pears and Baking Fruits: So that all these Expositions having their Defects, upon Experience it is found best to have Walls erected for Fruit, not directly facing the cardinal Points, but between them; as, the South-East and South-West Aspect for the best Sort of Fruit, and the North-East and North-West Aspect for the worst Sort, which will generally answer all Expectations.

The best Figure for a Fruit-Garden, is a Square about half as long again as broad; and the Extent may be from forty Yards in Length, and twenty four in Breadth, to one hundred and sixty Yards, and one hundred; tho' thirty or forty Yards square is a sufficient Compass of Ground for a Garden to
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contain the most delicate Fruits ; and square Plats of Ground are the most commodious, as uniform Beds of Strawberries, Artichoaks, Asparagus, Sallading, &c. to fill up the Spaces, cannot be well laid out in Ground of irregular Dimensions.

When the Situation and Exposition of a Garden are fix'd, and the Extent laid out, the next Thing we come to is the best Fruits; of which I shall give a short but useful Catalogue for all Expositions.

For a South Aspect, inclining to the East or West, the best Peaches are the *Red and White Magdalene*, the *Minion*, the *Royal Peach*, the *Old Newington*, the *White Peach*, the *Purple*, the *Admirable*, the *Chevreux*, the *Nivet*, the *Bourdine*, the *Red Roman Nectarine*. Apricots for East and West Walls, are the *Orange Apricot* and *Masculine Apricot*. Figs against a South-East or South-West Wall, the *White Fig*, and *Long Purple*. Pears for the South-East or South-West Aspect, are the *Buree du Roy*, the *Summer Bon Cretien*, the *Orange*, the *Verte Longue*, the *St Germain*, the *Magdalene*, the *Ambret*, the *Colmar*, the *Muscat*, the *Ambret*, the *Spanish Bon Cretien*, the *Chrysan*, the *Winter Bon Cretien*: For North-East or North-West Walls, the *Katherine Pear*, the *Orange Bergamot*, the *Rousellet*, *Worcester Black Pear*, are the most proper; and for Dwarfs, the *Bergamot*, *Windsor*, *Swan's Egg*, *Cuisse Madam*, &c. Of Plums there are few fit for the best Walls besides the

the *Imperial Blue* and *White Perdigron* and the *Apricot Plum*: For the worst Walls and Dwarfs, the *Royal*, the *Orleans*, the *Violet*, the *Muscle*, the *Perdigron*, the *Queen-Mother*, the *Damascene*, the *Yellow Russet*, the *Pear-Plum*, the *White Bonum Magnum*, the *Damson*, are to be chosen. Cherries for Dwarfs or Standards, or against East or West Walls, the *May Duke* and the *Orleans*, or *Bloody Heart*; and the *Morella* for a North Wall.

This Collection of Fruits will very well serve for your best Fruit-Garden; and before I come to their Planting, it may not be amiss to observe, that Peaches and Vines thrive best in dry light Ground; that Plums, Cherries, &c. delight in a strong Earth; and Figs, Pears, Apples, &c. agree with all Sorts of Soils, provided the Ground be near three Foot deep. The Season of Planting is from the Middle of *October* to the Middle of *March*, but it is not to be undertaken in frosty Weather. And the Autumn is preferable to the Spring, by reason the Tree, during the Winter, will be better fix'd and settled, so as to withstand the Winds in *March*, and Drought of the Spring. For the Distance to be observ'd in planting of Fruit-Trees, a Wall of seven or eight Foot high, will require the Trees to be planted about fifteen or sixteen Foot asunder: And if the Wall be ten Foot high, twelve Foot Space will be enough; but the Apricot, Plum, and Cherry, ought to be planted at a greater Distance than a Peach or Nectarine.

When

When the Ground is not extraordinary good, it is to be enrich'd before you commence your Plantations: You must first dig Holes where you intend to plant your Trees, about three or four Foot square, and two Foot in Depth, which are to be fill'd up again with a good Compost of Dung and Mould; wherein you are to observe, that if the Soil be a hungry Gravel, or Sand, rotten Horse-Dung and Cow-Muck, mix'd with rich Mould, will be proper; and if your Ground be Marl, or stiff Clay, you are to get a Compost of Rubbish, Lime, small Pieces of Brick and Tile, Coal-Ashes, and Drift-Sand, to mix with Dung and Mould: Fill up the Hole with this half a Foot higher than the rest of the Level, and take Care to preserve some of the finest Mold near the Top, to plant your Tree in, and it will do very well: But untry'd Earth, dug from a Waste or Common fed with Cattle, is the best and most agreeable Soil for the Roots of all manner of young Trees.

Your Ground thus prepar'd to receive your Trees, and Stakes being put in the Middle of the Holes, as Marks where to plant them in the Order you intend, I come to the Planting, wherein I shall first take Notice of the Pruning necessary. When you have made a good Choice of Trees from well-manag'd Nurseries, you are to shorten the bigger Roots to about six Inches from the Stem, and to take off all the small Fibres; and the Head must be prun'd so, as to leave not above two Branches

Branches, and those reduc'd to about six Inches above the Place of Grafting: A single Branch is sufficient for a Head; and this Pruning may be done any Time before its beginning to shoot in the *Spring*.

If your Tree be for the Wall, set the Root as far from the Foundation as the Top will allow: By this Means the Root will have a greater Liberty to spread backward, and consequently the Tree will thrive the better. When the Tree is thus plac'd in the Ground, with the Head spreading against the Wall, fill the Hole with the Mould, wherein if the Tree be young and tender, you are to take Care to fill in the Soil gently, but for others less Care will suffice. And the last Thing is the Security of the Root from Frosts, which may be done by laying half rotten Dung all round the Tree, and upon that Fern or Straw five or six Inches thick, two or three Foot every Way from the Body of the Tree: But to keep the Roots cool and moist in the Summer, a small Quantity of Sand and Pebble-Stones laid round, a little Distance, will be most effectual.

Where you set Trees in Borders, in the preparing of your Ground, it is a common Practice to make a Trench by the Wall-Side, two Foot broad and the like Depth: For this Trench you are to mingle good old Dung with the Earth, and fill it up lightly near as high as you intend the Borders to be, and then you are to tread it down, so that it be not
above

above half full in the Places you design to set the Trees. But where the Soil is defective in the Bottom, or a young Tree is planted in the same Place and Soil where an old one has been, you must prepare your Ground with Compost as far as the Roots of the young Tree need to go, or the old ones has grown: And it is very prudential to set the Trees shallow, and raise the Earth about them, tho' in a warm dry Soil a little Elevation will serve; but in a wet Clay you cannot ordinarily plant too high; and altho' some of the bigger Roots should afterwards appear above the Surface of the Earth, they will do very well, if you in the Beginning cover the Roots with the best fine Mould, (and herein you are to allow for the Settling of the new Earth, which usually sinks three or four Inches) and preserve them moist for one Year against the scorching Heats of the Sun.

These are the most useful Observations relating to planting of Fruit-Trees; and as they chiefly concern Wall-Fruit, before I conclude this Head, I shall communicate a few Observations relating to the building of Fruit-Walls.

Of all Materials proper for building of Fruit-Walls, Brick is certainly the best, it being not only the handsomest, but the warmest and kindest for ripening of Fruit, besides the most convenient for Nailing; for small

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Lath.

Lath-Nails will in this Case suffice, whereby a considerable Expence is sav'd, which would be unavoidable in Stone-Walls, where the Joints are larger: And your Brick with Copings of Freestone, and fine Stone Pilasters, or Columns, at proper Distances, to separate Trees, and break the Force of Winds, make the most beautiful and profitable Walls of any other whatsoever.

Some Persons advise, in the building of Garden-Walls to make them with Half-rounds, every Semicircle being eight Yards round on the Inside, and about six Yards in the Face or Diameter, each taking in two Trees; and that between every Half-round there be two Foot Breadth of plain Walling, on the Top of which may be plac'd a Flower-Pot about two Foot in Height, to contain a handsom Green, and a Vine to be planted at the Foot, to fill up the Space to the Top: By Means of these Rounds every Part of the Wall will, one Time of the Day or other, enjoy a Share of the Sun; and the best Walls will not fail of being exceeding hot by the Reflection or Collection of the Sun-beams in the Rounds, and also be more secure from pernicious Winds.

In some Parts of *England* I have known Walls built partly of Stone and partly of Brick, which have been exceedingly commodious: The Brick of itself is not substantial enough for Walls in some Places, nor indeed is its Duration any where equal to Stone; wherefore a great many Gentlemen, to have
both

both substantial and wholesom Walls for Fruit, have been at the Expence of building a double Wall, the Outside being compos'd of Stone, and the Inside of Brick, or rather a Stone-Wall lin'd with Brick. And where you are to build Walls for Fruit, against Terras-Walks, to prevent the ill Effects of Damps, it is a very good Method to leave a Space of about two Foot the whole Length of the Wall, between the inner Wall next to the Bank of Earth and the outward Wall, to receive your Fruit, whereby the last will be always render'd healthful, and the Products of Fruit will answer your Labours.

These Methods of erecting Walls I must confess are very expensive; but if you propose a Quantity of Fruit, you cannot well avoid them: Tho' Mr. *Laurence*, in his Tract of Gardening, makes Mention of Walls built of Earth and Straw well temper'd together, known by the Name of Mud-Walls, as proper for Fruit. These Walls are common in *Northamptonshire* and *Leicestershire*, and this Gentleman affirms they are better than any other Walls for accelerating the Ripening of Fruit; and if they are made of very good Earth, and exactly temper'd, Nails will do to fasten the Trees; otherwise, Pegs of Wood must be made, such as are us'd for bad Walls, particularly of Stone, where the Mortar is decay'd, and the Joints thereby become the larger. The large Copping of Straw that is usually laid upon Walls of this Kind, is a

great Advantage to the Fruit, in sheltering them, and keeping off all perpendicular Rains: But these Walls are by no means sightly, for which Reason they are seldom us'd.

I had like to have omitted taking Notice, that Walls of an East Aspect are preferable to those of a West, by reason the early Rays of the Sun free the Fruits the sooner from cold and pernicious Dews, which, of Consequence, renders them most healthful to all Sorts of Fruit. To conclude this Chapter; When your Trees are planted, if you permit them to stand with their tall Heads tack'd to the Wall, (to prevent their being shaken) 'till the Beginning of *March*, you are then to shorten their Heads carefully, cutting away the Branches slopewise, the Slope facing the Wall, with a sharp Knife.

Pruning of Fruit Trees in general.

A skilful Gardener is not only a Physician to aged infirm Trees, but a Nurse to the young ones; and he may, with good Management, make Fruit-Buds grow where he pleases, but not when he pleases; and this by a discretionary Pruning.

When a Tree is planted, and has produc'd two fine well-dispos'd Branches, with some weak ones amongst them, the only Business you have then to do, is to shorten them all equally to within five or six Inches in Length. But if the Position of the two Branches be irregular,

regular, as one lower than the other, or both on one Side, there must be but one preserv'd to begin the Formation of a fine Figure.

It sometimes happens that a Tree will produce five, six, or seven Branches the first Year; in which Case it is sufficient that three or four of the best be preserv'd; for the rest must be wholly taken away. And a Multitude of Branches in the first Year, is not always a Sign of Vigour, they sometimes proving weak, from whence you may conclude there is an Infirmary in the Roots; though in Pruning, generally, a vigorous Tree cannot have too many Branches, if they are well order'd, as a weak Tree can't well have too few.

The Sap of all Trees must be kept within due Bounds for their Preservation, and greater Liberty is to be allow'd strong Trees than weak ones; for which Reason all strong and vigorous Branches are to be left of a greater Length than feeble ones, and the Branches of a sickly Tree are to be prun'd shorter, and to be fewer in Number than those of an healthful Tree. And it is best to prune weak Trees early, that the Sap may not waste it self on such Parts as ought to be retrench'd. Fruit-Buds that are nearest the End of the Branches, are usually thicker and better fed than others.

In the pruning of Wall Fruit-Trees, all Branches which shoot directly forward, are to be cut off close to the Branch from whence

they spring : And to preserve your Trees in their Beauty and full Health, the utmost Care is to be taken to keep them from being crowded with Wood, and it is oftentimes necessary to take away even bearing Branches ; for it is impossible that a too great Number of Branches can be well supply'd with Juices, whereby either the Blossoms will drop off, or the Fruit will never ripen, but wither on the Tree.

A convenient Space between one Branch and another is consistent with Regularity, and constantly to be observ'd in all manner of Prunings : And that you may please the Sight, you are to take Care not to let one Branch cross another, unless it be to fill a Space in the Wall, which is more unseemly ; though a slender bearing Branch may be sometimes permitted to steal behind the main Body of the Tree, or its larger Branches, and be no Offence to the Eye, but may gratify the Taste at the End of the Year.

The more Horizontally the Branches of a Tree are carry'd, the more apt and the better dispos'd that Tree is to bear Fruit ; and the more perpendicular the Branches are led, the more inclin'd such a Tree is to increase in Wood. When small weak Branches shoot from the like, and the third Shoot is strong, always use them as false Wood : And it is very difficult to strengthen weak Branches without sometimes cutting away others that are superior to them, even the upper Part of those from
which

which they shoot. Shoots put forth in *Autumn* are always bad, and must be taken off.

When an old Tree shoots stronger Branches towards the Bottom than the Top, and the Top appears in an ill State of Health, it will be necessary to cut it off, and form a new Figure from the lower Branches; but if the Top be vigorous, cut off the lower ones, unless it be those that are well plac'd, to continue for the Benefit of the Tree: And where old Trees are very weak, to preserve them, you are to disburden them almost totally, leaving very few Branches for Wood, and those to be shorten'd to five or six Inches, always taking Care that those as are left be not over much wasted.

These are the general Rules to be observ'd in the Management of Pruning, wherein I have been very exact and particular, without troubling the Reader with a tedious indigested Heap of Informations, or omitting any thing necessary. I proceed now to the particular Prunings for the various Sorts of Wall-Fruit Trees, and begin with the Peach.

Pruning of the Peach.

The *Peach* is so apt to put forth Plenty of bearing Branches, after it has been planted two or three Years, that there is no manner of Difficulty in making a Choice of those as are good and for your Purpose; but where the Peach-Trees are vigorous, it is necessary to defer the first pruning 'till they are

ready to blossom, that you may be at the greater Certainty in preserving those Branches which may be most likely to bear Fruit, and then to shorten them as they require.

The Fruit-bearing Branches are easily known by their swelling Buds; these are to be reduc'd to five or six Inches in Length, but the last Year's Shoots may be left ten or twelve Inches long: And in about three Years Space the Wood must be taken away entirely at several Prunings; but in the mean Time you are to take Care to furnish your Wall with other Wood. You must always cut out what great Wood can conveniently be spar'd, and take away all dead and yellow sickly Branches.

You are not to commence your Pruning of the Peach 'till the hard Frosts are over. When you have reduc'd your Tree to Beauty and Order, you have little to do, but thinning your Fruit 'till *Midsummer*, when the Shoots are to be shorten'd and fasten'd to the Wall; and 'tis no Matter in what Order you perform this Operation, (so as you give the Fruit all the Advantage of the Sun you can) because it must be alter'd the next Pruning.

If your Peach Trees make too much Haste to bear, it is a certain Sign of Infirmary, and they must be manag'd accordingly, by Pruning the Branches short, and plucking off all or most of the Blossoms or Fruit; and this is less difficult a great deal than when a Peach is over vigorous; for then Nature is apt to
make

make a Confusion, which requires great Skill to know what Branches to chuse, and what to reject.

Stone Fruit, especially Peaches and Apricots, require a second and sometimes a third Pruning; the last of which is to be perform'd towards the Middle of *May*, when the Fruit is either knit or blasted.

The Culture and Management of the Nectarine and Apricot is the same with that of the Peach, but the latter is the most apt to run into Wood.

Pruning of the F I G.

Tho' this Tree is not very common in *England*, yet we have no Tree that produces a more plentiful Crop, if rightly manag'd and prun'd as it ought to be.

The Pruning of this Tree is very different from that of others; for as the Practice is to take off the small Branches in pruning of other Trees, so here it is to be avoided, by Reason this Tree puts forth its Fruit chiefly at the Extremities of the last Year's Shoot, and commonly at the three last Eyes; but you may cut some of the weak smaller Shoots, which do not promise to bear, provided you do it close to the great Wood.

You must take out the great Wood entirely, to avoid Confusion; and the Branches of the Tree ought not to be permitted to grow too high, which would prevent their being full;
therefore

therefore the new thick Branches ought to be shorten'd Yearly to a Foot or thereabouts, and the Bud at the End of the Branches to be broken off in the Spring Time, that instead of one single Branch it may have two, and it may cause them to shoot out Figs the earlier.

The Season of Pruning the Fig, is the latter End of *March*; and whatever you cut from the Fig, you must do it as close to the great Wood or Root as you can; and I have known a whole Tree entirely cut down to the Roots after an unkind Winter, for its Recovery from a sickly State of Health, which it has effected. Take care to keep it from Suckers, which this Tree puts forth in great abundance.

It is best in the Summer to let this Tree have some Liberty from the Wall, and not to let it continue close tack'd, as other Fruit Trees; but in the Winter some of the straggling Branches ought to be cut off, and the best and biggest Branches to be tack'd close to the Wall in *November*, that they may be the more effectually shelter'd from the Frosts in the Winter, by a Defence of Mat or otherwise, especially in an extreme cold Season.

The *North-East* Wind, and sometimes a *South* Wind, proves fatal to these Trees,

Pruning

Pruning of the VINE.

The Vine puts forth the most and the longest Shoots of any other Fruit-Tree; but the lesser and weaker Shoots never bear any Fruit, and therefore they must be entirely taken away.

Vines require a first, second, third, and sometimes a fourth Pruning; the first Pruning must be done before the End of *February*, and herein the Vigour of the Tree is to be regarded: The Number of Branches to be left are to be proportion'd so, as to make no Confusion in the most vigorous Trees; and the thickest and best plac'd are to be preserv'd, limiting their Length to four or five Buds or Eyes, and the first and second only generally bear Fruit.

The second Pruning of the Vine is to be perform'd about the Middle of *May*, when the Branches have shot two or three Foot, and the Bunches of Grapes are perfectly form'd: The Manner of doing it is by pinching off the Branch about six Inches above the Fruit, after which you are to Nail it to the Wall. The third Pruning is to be commenc'd about *Midsummer*; the Design of this is to reduce the Multitude of luxuriant Branches, and to let in the Rays of the Sun, to accelerate the Ripening of the Fruit; but in the Operation you are to have a discretionary Regard to Rains and cold Nights,
which

which we have sometimes even at this Time of the Year. If the Fruit-bearing Branch be not very vigorous, it ought to be cut close to the Fruit in *July*: And if your Vine be, on the contrary, extremely vigorous, it will produce long Shoots from the Extremity of the last Pruning, which must be shorten'd again, and makes the fourth Pruning.

A Vine ought to be always kept thinner of Wood than any other Fruit Tree, and for that Reason there cannot be too great Care taken in inspecting what Branches of old Wood may be well spar'd, and how you can conveniently supply their Places with new Shoots that are vigorous. The old Wood is to be cut out, and the Branches of the foregoing Year are generally to be taken away, unless it happens to be an old Vine, and you cut off the old Stem, supplying its Place with a young one; or you have an Occasion to encrease the Height or Spreading of the Tree, and then they should be shorten'd to the leaving only two Eyes.

Pruning of the PEAR.

As the small Branches of the Vine produce no Fruit, so likewise the large Branches of the Pear-Tree are useless in the Bearing.

There are few Observations to be communicated relating to the Pruning of this Tree, besides the general Rules already laid down; but those are to be carefully follow'd, for
this

the Pear, in a rich Soil, is apt to be very unruly, running prodigiously into Wood and luxuriant Branches.

For this Reason, Plashing is of the most Signification, especially of very vigorous Branches: Cutting them about half Way through, near the Place from whence they shoot, will sufficiently abate their Vigour. And to fill a Vacancy in a Wall, this Management is of great Use; for by this Means you may reduce your Tree to what Form and Order you please. But Plashing is not to be practis'd on any Tree but the Pear or Plum.

The full-bearing Buds of the Pear-Tree appear very visible in *November*, when the Leaves are off; and they are to be carefully preserv'd. All Branches proceeding from the Knob, whereon the Stalk of a Pear grew, are to be taken away, but the Knob it self is not to be cut. The Extremity of the last Year's Pruning is to be taken off, and all false Wood or Water-Shoots, *viz.* those as have Eyes at a greater Distance than ordinary, are to be perfectly cut away.

Winter and Summer *Bon Cretien* Pears spread and extend themselves beyond any others, wherefore you must allow them sufficient Room and Height; and a Confinement by short Prunings would render them barren and full of Wood.

A languishing Pear-Tree may be restor'd by Pruning, and Removal into better Ground;
but

but this Management will not do with the Peach, especially if the Gum appear.

Pinching of Pears or Peaches, is an Operation perform'd upon thick new Shoots, within two or three Eyes of the Branch they proceed from: It is to be done on the Top of the thick Branches, which would otherwise remain useless from their Situation, and yet spend much Sap.

Cherries and Plums require little Skill in their Pruning, so that the general Directions are sufficient for their Management.

Grafting and Inoculating.

These are us'd for the Propagation of Vegetables. *Peaches, Nectarines, and Apricots*, are not to be rais'd any other Way than by Inoculation or Budding; and as for *Pears, Cherries, and Plums*, tho' they may be grafted, yet the Inoculating is to be prefer'd, it being less hazardous and more pleasureable.

The Method of Inoculation is thus: About *Midsummer*, or a Month before or after, which are good Seasons, take off a vigorous Shoot from a Tree you would propagate; then make a Choice of a Stock about three or four Years Growth, and in a smooth Place of it make a downright Slit in the Bark, a little above an Inch in Length, and another cross-wise, at the Bottom of that, to give Way to the opening of the Bark: This being done, with your Pen-knife gently loosen the

the Bark from the Wood on both Sides, beginning at the Bottom ; then prepare your Bud, by cutting it off with your Pen-knife, and entering pretty deep into the Wood, as much above as below the Bud, to the Length of the Slit in the Stock. After the Bud is thus prepar'd, with the Point of the Pen-knife and your Thumb take out the woody Part of it, (but herein take particular Care that the Eye of the Bud be preserv'd) then put your Bud in between the Bark and the Wood of the Stock, at the cross Slit, leading it upward by the Stalk where the Leaf grew 'till it exactly closes : Then bind it about with coarse woollen Yarn, the better to make all Parts of it regularly close, and the Bud incorporate it self with the Stock ; and the Operation is done.

In three Weeks the Bud will be incorporated, and then you must loosen the Yarn, that it may not gall the Place too much, which will be dangerous in a vigorous Stock. The quicker this Operation is perform'd the better ; and you are to put two or three Buds into one Stock of *Peaches* and *Nectarines*, that if one do not succeed, another may.

If your Buds inoculated in *June* do not hit, you may make a second Attempt the same Year on the same Stock, and that with very good Success. And any Time between the Beginning of *June* and the latter End of *August*, in a good Season, most Trees may be inoculated ; and sometimes *Pears* may be inoculated
in

in *September*, and do very well: But Care is to be taken that the Branch or Shoot made Choice of for Buds to inoculate with, do not lye by any Time (as in Grafting) for it is to be immediately employ'd.

When your Stocks are large, and the Bark is become thick and stubborn, that it will not readily part, nor handsomely close up, you must be content to graft; but you may inoculate on slender Shoots made near the Grafting Place, even the same Year. And in respect to Stocks in general, you cannot expect Success, if the Bark does not readily part from the Wood on making an Incision with your Pen-knife, and the Sap run well. The *Cherry*, *Plum*, and *Pear*, rarely fail to answer Expectation in Budding; but the *Apple* is very apt to deceive us, because the Bark is not so inclineable to part as in other Fruit.

There are a great many Ways of Grafting, but I shall satisfy my Curiosity with mentioning only four. The first is the ancient and common Method of Grafting in the Cleft, or Slit-Grafting, perform'd on *Pear*, *Cherry*, and *Plum* Stocks, the latter End of *February* or Beginning of *March*. After you have chose your Stock, in a smooth Place cut the Head of it off slopewise, then even the Top horizontally with your Knife: This being done, make a Slit near two Inches deep down the Middle of the Stock, with a large strong Pen-knife or otherwise; then prepare your Scion
(taken

(taken from a vigorous Shoot of the foregoing Year, and cut and laid in the Shade for about a Fortnight or three Weeks before us'd) sloping it on each Side from a Bud or Eye, but leaving it thinner on that Side which goes into the Stock than on the Out-side, so that it may conform it self to the Slit in the Stock; then place the Scion in the Stock, and close the Bark of each exactly. This is all you have to do in this Operation besides Claying, which is done by tempering Clay and short Hay together, and putting it round the Stock and the lower Part of the Scion, but so as not to disturb the latter. The Scion must not be left with above three or four Eyes above the Stock: And in Case the Stock be large, you may put in two Scions in the Cleft, one on each Side. If the Stock be very large you may use a Mallet and a large Knife, or other sharp Instrument, to make your Cleft, and prepare a Stick of hard Wood, by cutting it slopeways, to put into the Slit upon pulling out your Knife, and keep it open for the Scion; And if your Stock be so strong as to pinch your Grafts, it will be necessary to drive a small Wedge of dry Wood into the Slit, but not so as to let the Scion loose.

Grafting in the Bark is the next Method I have to observe, and this is preferable to the other, but it is generally perform'd only on off *Apples*. The Way of this Grafting is to cut the Head of the Stock, as already directed, but

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instead

instead of flitting the Stock, slit only the Bark, a little above an Inch on the South-West Side, or as long as the slop'd Part of the Scion; and at the Top of the Slit loosen the Bark with the Top of your Knife: Then with a smooth Instrument, made of Ivory or hard Wood, cut slopewise, as the Scion, make Room for the Scion, by thrusting it down between the Bark and the Wood of the Stock, where the same was slit: This done, take your Scion (being prepar'd with a flat Slope about an Inch long, ending on a Point, and begun from the Backside of an Eye) and put it into the Stock, thrusting the Top of the Slope as low as the Top-Surface of the Stock, but first taking out your opening Instrument; and you are to order the Bark on each Side the Scion to fall close to the Stock: All which being done, you are to clay it over as before. This Grafting is to be perform'd in the Beginning of *April*, and is esteem'd beyond the other, as the Union of the Scion and the Stock is the sooner compleated, and the Stock receives not so grievous a Wound.

The third Method of Grafting is by Approach, or Inarching; this is perform'd where a Stock grows so near another Tree, whose Fruit you would propagate, that it may be join'd with a Branch of that Tree, by cutting the Sides of the Branch and Stock about three Inches long, and so fitting them, that the Passages of the Sap may meet; in which Posture let them be bound and clay'd:
When

When they are well cemented, cut off the Head of the Stock about four Inches above the Binding, and in the Month of *March* following cut off the Stub that was left of the Stock, as also the Scion underneath; then close the grafted Place, that it may subsist by the Stock only. This Manner of Grafting agrees best with Vines, Oranges, Pomegranates, and such like Shrubs; and is also done by cutting off the Head of the Stock at first, sloping it about two Inches long, and joining the Scion thereto.

The last Grafting I shall take Notice of is Whip-Grafting: In this Operation both the Stock and Scion should be of the same Bigness; the Stock must be slop'd a full Inch or more, and the like must be done to the Scion, and then one is to be ty'd upon the other; or else a Shoulder may be made on the Scion, to suit with which, the Top of the Stock should be cut; then bind them together and clay the Place.

Having now gone through the several Sorts of Prunings, Graftings, &c. I shall finish this Chapter with the Stocks proper for all Kinds of Fruit. For Peaches, Pavies, &c. Stocks may be rais'd from the Stones of those Fruits, or you may graft on the same Trees; Almond Stocks are also very good, as are likewise the Suckers of Muscle-Plums and Pear-Plums, where those Trees were never grafted. For Apricots and Plums, the several Sorts of Plum-Suckers will do, or Stocks of any Kind of

Plums, except the Damson rais'd from the Stone. For Cherries, the Stocks that are rais'd from the common wild Black Cherries are best. For Pears, the Trees or Stocks that are rais'd from the several Kinds of Pears: And likewise the Quince Stocks are very good, as they cure the too great Luxuriancy of Growth common to these Trees, and for a Time answer the Purpose of bearing quickly; but they are not long-liv'd, neither do they bear such fair large Fruit, or make such handsome regular Trees as those grafted on a Pear-Stock, for which Reason they are often rejected. Stocks rais'd from the several Sorts of Kernels are most fit for Apples.





C H A P. X.

Of Orchards, Vineyards, and their particular Culture.

THE Advantages arising from well-manag'd Orchards are so very considerable to the Owners, that I esteem an Account of their particular Culture worthy Place in a Treatise of this Nature.

And, first, I shall take Notice of the Preparation of your Ground for these profitable Plantations. If the Ground be a Turf or Green-Sward, it will be necessary to give it a thorough Plowing, two Years before you begin to set your Trees therein, to render it mellow and loose; and such Manure is to be employ'd, as is most agreeable for the Improvement of the Land. A flat, watery, and shallow Soil may be improv'd by plowing and ga-

thering up the Ground near the Places where the Trees are to be planted, and the Furrows between will help carry off the Water. But if the Land be springy, it must be trench'd at the Head of the Spring, deeper than the Channel runs in the Earth: This Trench may be left open and cleans'd yearly, or fill'd with Osier-Boughs, and cover'd at Top with the Earth and Turf that was dug up, and tho' the latter will raise the Ground much higher than the other Land; yet the Wood and loose Earth will very much sink it by Degrees.

The Situation of your *Orchard* ought to be chosen in Land a little declining, lying open to the South, South-East, or South-West, and defended from the North Winds by Woods, Espalier Trees, Buildings, Grounds, &c. the Soil to be rather dryish than moist, the Earth fat, and natural Mould deep; for Orchard Fruit-Trees grow not only very large, but broad, and shoot into the Earth a considerable Depth. To preserve the Trees from Winds, it is a very good Method to plant Walnut or Chesnut Trees in Rows, two or three of them on the North Side of the Orchard, which will make a very good Defence; and some Shelter is likewise necessary on the West Side, to break the Force of the Autumnal Winds, which do very great Injury in throwing down the Fruit.

If your Ground be uneven it ought to be levell'd, or else such Trees as grow pendant, or are not apt to grow tall, must be planted in the highest Situation, and such as are aspiring, in the lowest Places: And for the Position of your Trees, on the North Side you are to set the first Rows of Pear, or other Fruit-Trees, as are apt to grow tallest, and the rest southward, as they decrease in Height, as near as may be judg'd; that so all of them may in a greater Measure partake of the South Sun, and be less liable to the Blasts of the northern Winds.

In three Years Time after Grafting, Trees may be remov'd from the Nursery into the Orchard; and the best Time for transplanting is from the latter End of *September* to the End of *November*, tho' the sooner you begin this Work in Season, the greater Success you may expect. If the Leaves are not all fallen when the Trees are remov'd, they must be pick'd off; and if they are not very weak-body'd, they are to be prun'd, only three or four of the principal Branches must be left on the Top, that shoot outwards, which should be quite lopped off when they arrive at almost a Year's Growth: But if the Trees are weak, those chief Branches are to be prun'd to a Bud or small Twig; and in all Cases the Ends of large Roots are to be reduc'd.

Orchard Fruit-Trees are to be planted at no less Distance than eight Yards, and not to exceed fourteen, wherein Regard is to be had as well to the Kinds of Fruit-Trees to be planted as the Soil ; for some Sorts of Trees take up a great Deal more Room in their Growth than others ; and in rich Land no Person can be ignorant, but the Tree must arrive to a greater Stature than in a poor Soil ; and a good Distance is always the best, not only for the Growth and Health of the Trees, but likewise for the Ripening of the Fruits.

I could here recommend a more than ordinary Care in the laying out of the Orchard, so as to make it appear with the utmost Beauty and Magnificence ; I would have a handsome Walk all round, a grand one thro' the Middle the whole Length, and a spacious cross Walk. This might be effected by planting all your Trees on a Line, leaving near a double Space between the Rows, in the Middle, on the Sides, and a-cross, and planting the several Walks of several Sorts of Fruit ; as the Middle Walk may be lofty Pear-Trees, the Cross Walk your larger Kinds of Apple-Trees, one End Walk of Golden Pippins, the other of Cherries, and the two Side Walks of Codlins, or other Fruit-Trees in Hedges. This Method, and keeping your Walks mow'd, would make an agreeable Variety, and render your Orchard as delightful as a Grove or little Wood ; but herein Care is to be taken to give
the

the various Kinds of Fruit-Trees their proper Situations and Positions, otherwise the Beauty of your Orchard will lessen the Product of Fruit, and you may dearly purchase your Pleasure.

It is best to remove Trees very young, provided it can be done with Security, and that they be expeditiously set in the Places assign'd them after they are taken up, pruning the greatest Part of the Tops, but not cutting too much of the Root. And when you are to remove Trees of ten or twelve Years old, a circular Trench must be digg'd round them the *November* before they are transplanted, as narrow as may conveniently serve; but so deep as to meet with most of the spreading Roots, at such a Distance round about the Body of the Tree, as you would cut the Root off at when you remove it. As soon as the Trench is made, the Roots are to be cut off clear, and without splitting or bruising the Bark, and then the Trench is to be fill'd up again: These great Roots by the *October* following will have put forth many fibrous Roots, and have made Preparation for more; which, upon Removal, will enable the Tree to draw a greater Quantity of Nourishment than otherwise it would do, by which Means it will prosper the better in its new Situation. And Care must be taken in transplanting of large Trees, that the same Side of the Tree be planted to the South East, &c. as formerly stood that Way; unless it be a leaning Tree, when the inclining Side is to be set towards the South West,
from

from whence we have the strongest Winds, without any Regard to its former Position.

In the Management of tall Orchard Fruit-Trees, you are to cut off all the Side Branches 'till the Trees are arriv'd to the Height desir'd; but if the Tree be design'd to spread low, some Branches must be left on each Side, but not so many as to weigh down the Tree: And for the first three Years they are not to be permitted to grow bushy-headed, which may be prevented by cutting off some of the inside Shoots, and such as grow cross one another, or pendant. If the Soil be not rich enough, it is to be amended in two or three Years in the Winter, by opening the Earth round about each Tree on the Outside of the Ground that was digg'd at their first setting, and in a Month after, with some proper Manure mix'd with the Mould that came forth, filling up the Trench again. Or the Soil may be improv'd by making a Trench along the upper Part of the Orchard, with a small Gutter cut down to every Row of Trees, (the upper Turf about half a Yard's Breadth round about every Tree being taken off) and when a rainy Day comes, let the Draining of an adjacent Dunghill be let down one Row, so that, as near as may be, each Tree may enjoy it three or four Days at several Times in one Winter: But if the Position of the Orchard be such, as not to admit of this Method, then you are to take two or three Pails full of Water enrich'd with Dung, and carry it to every

every Tree, pouring it in where the Roots were open'd, being first stirr'd at the Bottom, and putting in the old Earth again against the Spring.

When an Orchard is first planted, the Ground may be sown with Beans, Pease, or other Kitchen-Legumes; or with Wheat, provided due Care is taken in collecting the Harvest, not to injure the Trees with reaping Utensils; and by this Means the Profit of the Soil may be continu'd from the Beginning: But in this Case the Ground must be substantially good, otherwise it will be so much impoverish'd, as to impair the Trees, and very much impede their Growth. The best Fence for an Orchard is the White Thorn, which may be plash'd when grown up, the better to prevent the creeping of Sheep or Swine into it; but no smooth quick Fence should be set, their Tops and Roots, when grown, being injurious to the Hedge and Fruit-Trees. Plant two Rows of good Hawthorn, and a dead Hedge on the Outside of the Ditch, and your Quick-set will grow the faster; for if the Hedge be upon the Ditch, it is apt to choak the Quick: But for an old Fence about your Orchard, you are to plash it well, amend the Ditch, and cut down all the Trees on the Outside of the Hedge, except on the North and West Sides; the one requiring a Defence to keep the Orchard warm, as the other wants a Security against the Autumnal Winds: And the South and East Sides ought to be open, to let

let in the Rays of the Sun, for the Ripening of your Fruit.

Of VINEYARDS.

That *Vineyards* may be so cultur'd in *England*, as to produce large Quantities of Grapes, and those so well ripen'd, as to afford a good and substantial vinous Juice, needs no Demonstration, when in several Parts of *Somersetshire* there are at this Time flourishing Vineyards; and the Vineyard of the late Sir *William Basset* in that County, has annually furnish'd some Hogsheads of good body'd and palatable Wines, which I have been credibly inform'd by Gentlemen who have drank considerable Quantities of it with the greatest Satisfaction.

It is not so much owing to the Inclemency of the Air here in *England*, that our Grapes are generally so very much inferior to those of *France* and other hotter Climates, as to the Want of an exact Culture; tho' I confess at the same Time, that the best Management will not answer our Expectations without a tolerable Season to ripen the Fruit; and sometimes the Varioufness of the Weather in the Summer will unavoidably render the Fruit sow'r and immature; but this does not always or generally happen, and therefore we are not to be discourag'd.

To

To proceed to the Culture and Management of Vineyards. When you have mark'd out the Ground design'd for your Vineyard, in the Month of *July* plough up the Sward, while the outermost Coat of the Earth is very dry and combustible, or burn-beak it, and in *January* following spread the Ashes. The Ground being thus prepar'd, cut Trenches a-crofs from East to West, on rising Ground, that the Vines standing in Ranks in this Position, the Rising and Setting of the Sun may by that Means pass thro' the Intervals, which it would not do if they were set in any other Situation, neither would the Sun be so capable to dart its Rays upon the Plants during the whole Course of the Day. Afterwards strain a Line, and dig a Trench about a Foot deep; place your Setts in it at about three Foot Distance one from another; trim off the superfluous Roots, leaving no more than three or four Eyes or Buds upon that which is above the Ground, and plant them near half a Foot deep, sloping after the manner as Quick-sett is commonly planted, so as they may point up the Hill: That being done, take long Dung or Straw, and lay on the Trenches, of a convenient Thickness to cover the Earth, and to preserve the Roots from dry piercing Winds, which would otherwise much annoy them, and from the excessive scorching Heats in Summer. Keep them well hoed and free from Weeds, and water them as Occasion serves.

The

The best Time to plant is in *January*; and the first Season of pruning the Vine is the Month of *January* in the next Year; and then you are to cut off all the Shoots as near as you can, except one of the most thriving ones, which is to be left with only two or three Buds 'til *May* the second Year after planting; and clear the Roots of all Suckers, which draw out the Virtue of your Setts, and carefully destroy the Weeds. The same Management is requir'd the third Year, by taking away all the Shoots in *January*, but one or two of the most prosperous. Then dig your whole Vineyard, and lay it level, taking Care not to cut or wound any of the main Roots with your Spade: As for the younger Roots, it is not so material. And this Year you may enjoy some of the Fruit of your Labour, which, if answerable to your Wishes, will put you upon providing Props for your Vines, of about four Foot long, to be placed on the *North* Side of the Plant. In *May* rub off such Buds as you suspect will produce superfluous Branches. When the Grapes are about the Bigness of Bird-Shot, break off the Branches with your Hand at the second Joint above the Fruit, and tye the rest to the Prop. This Breaking is preferable to Cutting, by reason Wounds made on Vines with a sharp Instrument, are very apt to bleed.

The

The next Year after Bearing being the fourth Year, you'll have generally three or four Shoots to every Plant; and therefore in *December* cut off all the Branches, except one that is strongest and most thriving, which you are to leave for a Standard about four Foot high, (taking away the rest close to the Body of the Mother-Plant) and to tye it to your Prop 'till it be large enough to make a Standard of itself: Neither must you permit any Shoot to break out, but such as sprout at the Top four Foot from the Ground; and these in *France* are commonly cut off every Year, depending upon the new Shoots, which are the only bearing Branches. But some propose to leave two or three Branches, one successively after the other, and by this Management they always cut off the oldest every Year, and nurse up the other young ones; tho' herein the Number of the Branches should be proportionable to the present Condition of the Vine. In *August*, when the Fruit begins to ripen, break off those Shoots that you find too thick, and take away some of the Leaves discreetly from the Fruit; and if in breaking the Shoots you perceive any Plant to bleed, rub some Ashes upon it, or sear it with a hot Iron.

If your Ground be poor, which will be discover'd by often stirring and the Weakness of the Crop, prune the Vines as is already directed, and spread good rotten Dung mixt with Lime over the whole Vineyard, letting
it

it lye all the Winter to wash into the Earth, and mingling about ten Bushels of Lime with a Load of Dung ; and if some Ashes and Soot be likewise thrown upon the Ground, it will do very well. Turn in this Manure about *February* with a slight Digging, but not too deep ; and this is to be done in a dry Season, and not in wet Weather, lest it make the Ground bind too much, and encourage the Growth of rank Weeds. But to forward the Ripening of Grapes, and render the Plants fruitful, the Blood of Beasts mix'd with Lime or Soot is excellent to lay to the Roots of the Vines in *December* and in *July* ; and if the Season be very dry, Watering in *August* is a very great Advantage to the Trees.

In the Management of your Vintage, gather your Fruit in a dry Day, while they are very plump and transparent, the Seeds or Stones being black and clear, not viscous or clammy, when the Stalk begins to shrivel at the Part next the Branch, which is a Sign it has done feeding ; and if Rain or Frost immediately follow after they are thus fit to be gather'd, get them in as soon as is possible : It is best to cut, and not pull the Clusters of Grapes from the Vine, and to put them into Baskets, out of which take them gently, and lay them in Heaps on a Floor to sweat for four or five Days or a Week, which will very much accelerate their Ripening.

This

This is all I have to insert in this Volume; and I hope what I have mention'd, will prove a satisfactory Entertainment to all curious and polite Gentlemen, and perfectly instructive to those of my Profession. I shall conclude with some Lines from Mr. Dryden's Translation of *Virgil*, which embellish the Character of a skilful Gardener: They are; (speaking of an old *Corycian Swain*)

*He reaps the Product of his labour'd Ground.
His Limes are first in Flow'r, his lofty Pines,
With friendly Shade secure his tender Vines:
He ranks his Elms in even graceful Rows,
Is skill'd the grafted Pear-Tree to dispose:
He makes with spreading Planes a cool Retreat,
To shade good Fellows from the Summers Heat.*



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